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ISOTHERMAL AND ISOPHOTIC ATLAS OF THE MOON

CONTOURS THROUGH A LUNATION

by J. M. Saari and R. W. Shorthill

Prepared by
THE BOEING SCIENTIFIC RESEARCH LABORATORIES
Seattle, Wash.
for

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ABSTRACT

Infrared (10-12 microns) and photometric (0.45 microns) measurements were made with a rapid-scan system over the illuminated lunar disk through a lunation. Isothermal and isophotic contour charts are presented for 23 phase angles, location information being provided by overlaid standard orthographic grids. The observations were made with a resolution of 8" and 10" arc allowing correlation with topographic features. Rougier's measurements of the integral brightness of the Moon with phase angle were used to provide the photometric calibration. In most cases, the isotherms were calibrated with reference to a calculated value of the subsolar point, which included corrections for the local albedo, the distance to the Sun, and directional effects. Otherwise, the calibration was done taking into account atmospheric losses and using a blackbody calibration of the detector.

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I. INTRODUCTION

The atlas presented here results from a program of mapping the illuminated disk of the Moon through a lunation in the far-infrared and visible wavelengths. The Moon has been mapped previously in the infrared (Geoffrian, Korner and Sinton, 1959); the contour intervals and spatial resolution used precluded correlation of the results with topographic features. However, a limited number of crater regions were mapped by Saari and Shorthill (1963) for which correlations could be made. Many photometric studies of the Moon have been made [see for example, Fedoretz (1953), Sytinskaya (1953), Van Diggelen (1959 and 1964), and Gehrels, Coffeen and Owings (1964)]. Most of this work has been limited to specific lunar locations. The present work supplements the measurements of the above investigators (for a preliminary report, see Shorthill and Saari, 1965a). With the focal plane scanner used, the Moon was mapped at 0.445 and 10-12 microns for 23 phases through a lunation. The positional accuracy of the scanning, together with the spatial resolution chosen (8" or 10" arc), allows the correlation of the results with topographic features.

The isophotic contours are useful for the study of the photometric function for different classes of features and for the distribution of albedo; they have engineering applications to photographic and vision problems on the lunar surface. Likewise, the isothermal contours by themselves allow the study of directional effects in infrared emission, the search for thermally anomalous areas, if any, on the illuminated disk, and the determination of the thermal environment. Finally, since the visible and infrared measurements were made simultaneously, the relationship between the reflected solar radiation and the resulting surface temperature can be studied.

By the nature of this program, a large amount of data has been amassed concerning the Moon. The publication of the results in a useful form is a problem and, after much consideration, it was decided to present the data in the form of isophotic and isothermal contour maps. Other formats for presentation of the data have been or are being

explored. One of the more interesting has been in the form of imagery. Since the data were recorded on magnetic tape, it has been possible to play back the tapes into an oscilloscope on which the scan raster was reproduced using the position-marker pulses. When the electron beam intensity was modulated with the signal and photographed, images of the Moon were produced. While the resulting visible images resemble low resolution photographs of the Moon, the infrared images have proven to be useful adjuncts to the infrared contours, in that the eye can discern subtle patterns and contrasts that are sometimes difficult to pick out in the contours. Figure 1 shows the full Moon visible image ($g = -2°16'$); contours of this scan are shown in LUNAR ISOPHOTES 8H. North is inclined 30° to the left of vertical. The infrared image in Figure 2 was electronically enhanced using high-frequency emphasis. On the illuminated Moon, regions of high albedo are cooler while regions of low albedo are warmer. This explains why the seas on the infrared image appear bright (i.e., warmer). Corresponding contours for the infrared image are shown in LUNAR ISOTHERMS 8H. A report has been published (Saari, Shorthill and Deaton, 1966) showing such imagery for the Moon near zero phase and during a total eclipse.

II. MEASUREMENTS

The measurements were made on the 60-inch telescope at Mt. Wilson, California during the latter half of 1963, and on the 74-inch Kottamia telescope of the Helwan Observatory in Egypt during December 1964. At Mt. Wilson, the measurements were made over five periods of time, consisting of about five days each, so chosen that phase angles from new to old Moon were more or less uniformly spaced. However, because of adverse weather conditions, no data for the full Moon were obtained there. Accordingly, the system was modified for use on the Kottamia telescope, with which observations were made before and after the total lunar eclipse of December 19, 1964. Although the primary purpose of this latter expedition was to obtain eclipse data, a number of scans were made on the illuminated Moon, three of which are included in this report. For the eclipse work we wanted to make three scans during

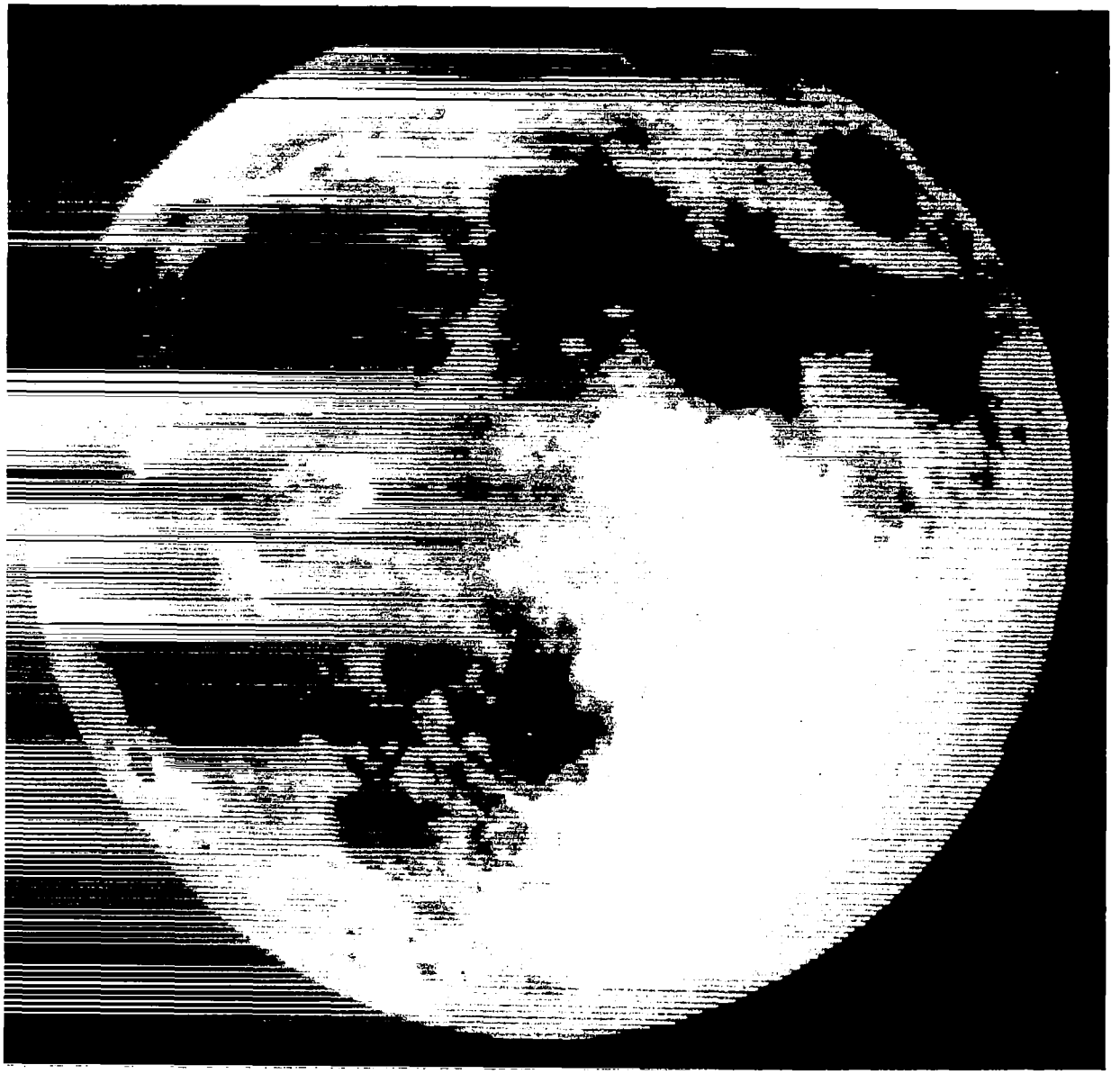


Figure 1. Visible image for Scan 8H. With a resolution of 10" of arc, 200 traverse lines are required to scan the entire disk.

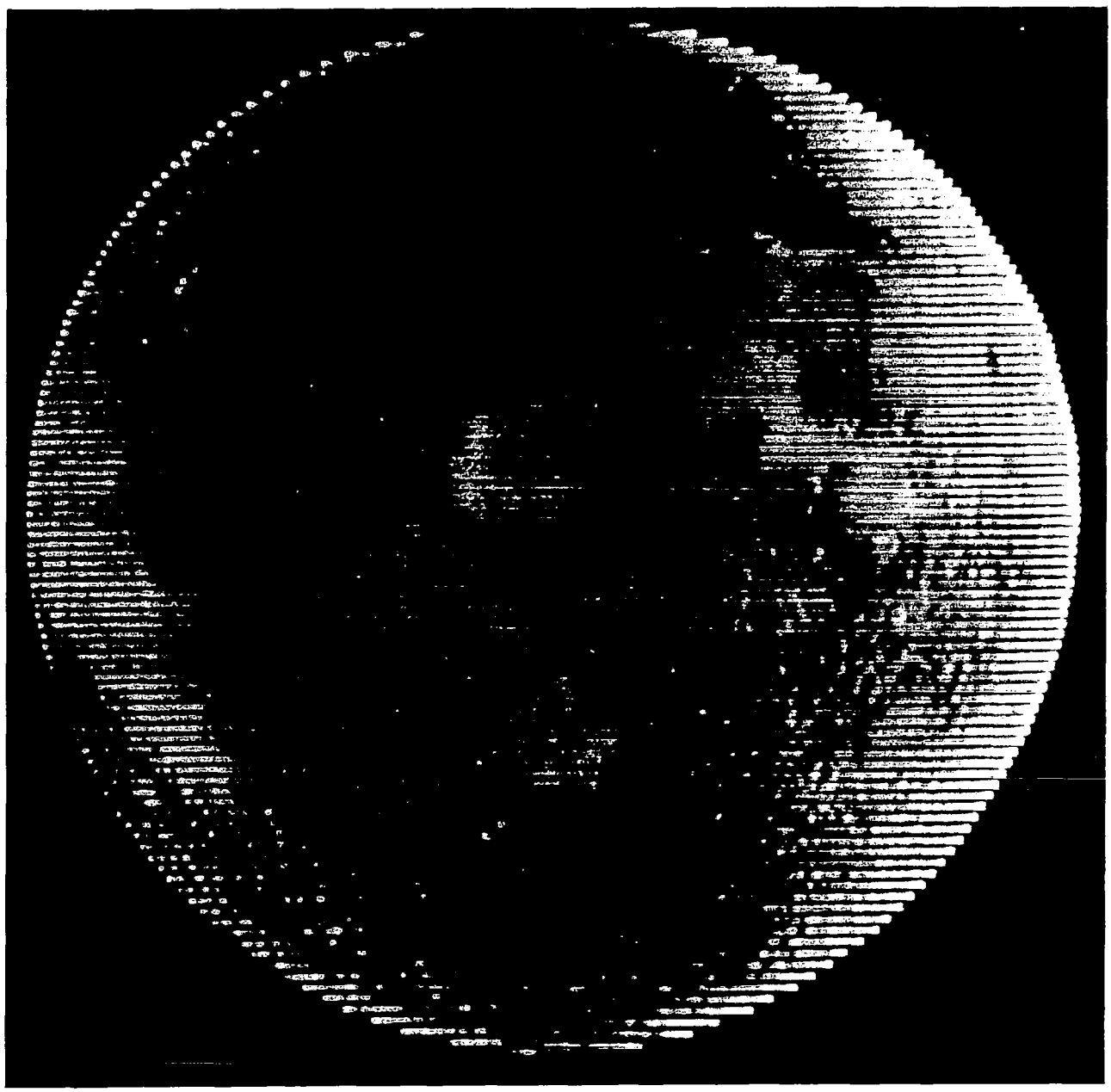


Figure 2. Infrared image for Scan 8H. The maria are warmer than the uplands and are therefore bright on this full Moon image.

totality; thus the resolution was changed to 10" arc from the 8" arc used at Mt. Wilson, the line separation also changed to 10" arc, and the traverse speed increased so that 17 minutes, instead of 30 minutes, were required to scan the disk.

The focal plane scanner was designed to scan a stationary image at the Newtonian focus, making it necessary to track the Moon precisely. For this purpose, a reflecting telescope of 8-inch aperture was mounted on the side of the large telescope near the primary mirror. Guiding was done on a small bright lunar feature; on the 60-inch Mt. Wilson telescope, pulsing devices for the right ascension and declination motions were used, the duration and repetition rate of which which could be varied independently. For the Kottamia telescope, the right ascension motion was adjusted for lunar rate and the pulsing device was used for the declination motion. The guiding was done by hand when the motion in declination was negligible, which was the case the night of the eclipse.

The intent was to guide to within 2" arc; however, on occasion, due to poor seeing conditions or erratic motion of the 60-inch telescope, this was not possible. Usually misguiding is revealed by shifts in the contours on the limb of the Moon along the direction of traverse. Where particularly obvious, adjustments have been made to eliminate the shift during the construction of the contours.

The various scans reported here are tabulated in Table I, together with pertinent data such as the time, phase angle, and topocentric libration.

TABLE I-a

SCAN DATA

Phase Angle Nearest Degree*	Scan No.	Date	Time UT	Topocentric Disk Center		Subsolar Point	
				Latitude	Longitude	Latitude	Longitude
°			^{H} ^{M}	° ′	° ′	° ′	° ′
-124	9C	8-24-63	3 35.0	5 55.7S	1 15.2E	1 02.5N	125 49.3E
-113	12C	8-25-63	4 03.0	5 37.2S	0 01.2E	1 03.0N	113 21.6E
-102	14C	8-26-63	4 30.0	5 01.8S	1 17.9W	1 04.3N	100 54.5E
- 92	15C	8-27-63	2 34.0	4 17.1S	2 06.7W	1 04.9N	89 41.0E
- 89	22E	9-26-63	4 10.0	0 51.6S	5 54.8W	1 29.4N	82 45.0E
- 65	25E	9-28-63	4 07.0	2 03.7N	7 06.7W	1 29.4N	58 24.0E
- 40	28E	9-30-63	6.40.0	4 46.2N	7 02.8W	1 30.0N	32 45.6E
- 29	33G	12-28-63	10 10.0	4 03.2N	1 18.0W	0 08.4N	27 43.2E
- 18	1H	12-17-64	20 16.2	1 56.2N	3 11.5W	0 03.8S	14 40.0E
- 15	34G	12-29-63	9 27.0	2 12.0N	0 40.0E	0 06.2N	15 52.6E
- 15	36G	12-29-63	10 33.0	2 27.6N	0 35.4E	0 06.0N	15 24.0E
- 4	5H	12-18-64	19 14.7	0 15.0S	0 55.0W	0 06.1S	2 32.4E
- 2	8H	12-18-64	23 34.5	0 07.0S	1 29.5W	0 06.6S	0 46.8E
+ 12	37G	12-31-63	6 53.0	0 54.6S	4 40.0E	0 02.4N	6 59.4W
+ 26	39G	1-01-64	7 40.0	2 37.5S	5 58.3E	0 00.0N	19 31.2W
+ 39	41G	1-02-64	10 41.0	4 05.3S	6 30.3E	0 02.4N	33 10.2W
+ 49	17D	9-07-63	10 16.0	6 48.8N	0 46.2E	1 16.2N	48.16.8W
+ 63	19D	9-08-63	11 42.0	6 01.5N	2 10.8E	1 16.8N	61 11.4W
+ 77	20D	9-09-63	11 08.0	5 04.2N	3 39.8E	1 18.0N	73 06.0W
+ 90	21D	9-10-63	11 51.0	3 41.7N	4 41.7E	1 19.2N	85 39.6W
+ 99	29F	10-10-63	11 14.0	0 50.3S	7 29.7E	1 31.5N	91 13.2W
+112	30F	10-11-63	13 00.0	2 25.8S	7 18.6E	1 31.5N	104 19.2W
+124	31F	10-12-63	13 19.0	3 42.7S	7 15.8E	1 31.8N	116 37.2W
+136	32F	10-13-63	13 25.0	4 48.4S	6 46.6E	1 32.1N	128 55.8W

*Negative before full Moon.

Moon Radius = 1738 km

Mt. Wilson: Longitude = $7^{H}52^{M}14.^{S}330$ Latitude = $34^{\circ}12'59''.5$

Kottamia: Longitude = $-2^{H}7^{M}18.^{S}000$ Latitude = 29 45 30.0

TABLE I-b

SCAN DATA

Scan No.	Zenith Angle (Degrees)	Nominal* Resolution (" arc)	Resolution Disk Center (km)	Resolution Elements Across Diameter	Number Points in Grid Fit	Location rms Error (" arc)
	°	"				"
9C	70.0	8	15.6	224	12	1.2
12C	70.2	8	15.6	224	14	1.4
14C	70.2	8	15.6	223	15	1.3
15C	52.8	8	15.5	224	23	2.1
22E	65.2	8	15.3	227	16	2.1
25E	56.2	8	14.8	234	22	1.3
28E	53.2	8	14.3	244	27	2.2
33G	58.7	8	13.8	251	34	2.2
1H	10.2	10	17.1	203	20	2.5
34G	36.7	8	13.8	252	28	1.9
36G	49.7	8	13.8	252	28	1.9
5H	31.0	10	17.1	204	35	2.4
8H	25.9	10	17.0	204	38	2.1
37G	26.9	8	13.9	250	31	2.0
39G	30.3	8	14.1	247	40	2.8
41G	16.5	8	14.3	243	23	2.4
17D	28.2	8	14.0	249	33	2.1
19D	21.3	8	14.0	248	29	2.7
20D	27.9	8	14.1	246	26	3.5
21D	28.3	8	14.2	244	16	2.1
29F	43.6	8	14.5	239	25	1.9
30F	34.4	8	14.7	236	21	2.8
31F	42.2	8	14.9	233	13	2.0
32F	52.4	8	15.1	230	8	1.0

*8" for Mt. Wilson, California.
10" for Kottamia, Egypt.

TABLE I-c

SCAN DATA

Scan Number	Phase Angle Disk Center	Average Brightness $\bar{b}$	Topocentric Semi-Diameter (" arc)	Temperature* Normalization Factor
	° '		"	
9C	-124 29.05	4.90	894.5	1.0048
12C	-113 19.6	5.75	894.9	1.0049
14C	-102 15.2	6.90	891.3	1.0050
15C	- 91 51.6	8.45	897.2	1.0052
22E	- 88 41.4	9.00	907.5	1.0013
25E	- 65 28.8	13.80	933.8	1.0015
28E	- 39 52.3	21.40	973.7	1.0016
33G	- 29 15.5	26.90	1003.6	1.0002
1H	- 17 52.0	34.30	1014.7	1.0003
34G	- 15 28.1	36.00	1008.9	1.0003
36G	- 14 59.7	37.10	1006.1	(VIS-only)
5H	- 3 53.7	51.90	1018.6	1.0004
8H	- 2 16.1	57.70	1020.1	1.0004
37G	11 42.0	38.80	998.3	1.0003
39G	25 36.8	28.20	985.2	1.0002
41G	39 50.8	21.00	970.1	1.0001
17D	49 12.3	18.10	996.2	1.0046
19D	63 23.2	14.10	993.0	1.0043
20D	76 42.1	10.70	986.2	1.0039
21D	90 16.3	8.25	978.4	1.0035
29F	98 40.2	7.45	955.3	0.9991
30F	111 40.1	6.38	944.3	0.9987
31F	123 50.6	5.20	932.2	0.9983
32F	135 39.8	4.36	921.0	0.9979

*For normalization to 1 AU multiply the temperatures for each scan by the factor indicated.

III. EQUIPMENT

Lunar infrared measurements prior to 1962 were limited by the restricted sensitivity of the detectors then available. However, the development of germanium infrared detectors with much greater sensitivity and speed made it possible to design a system which would rapidly acquire measurements over the lunar disk.

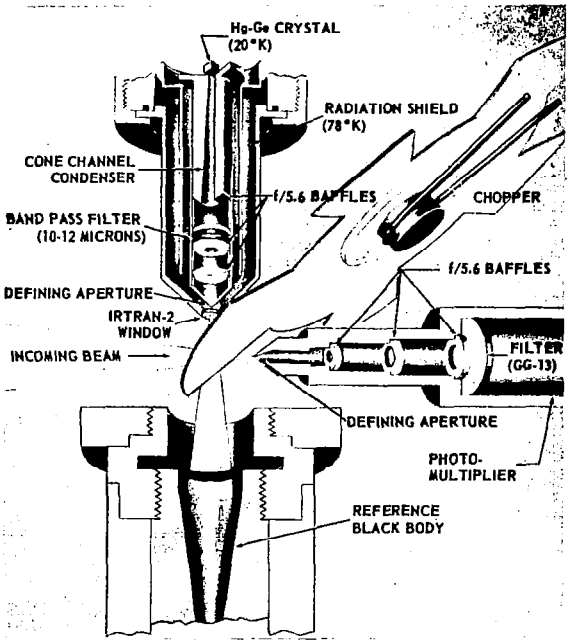


Figure 3. Cut-away view of the detector assembly showing the photomultiplier and mercury-doped germanium detector assemblies, the blackbody reference source, and the reflecting chopper.

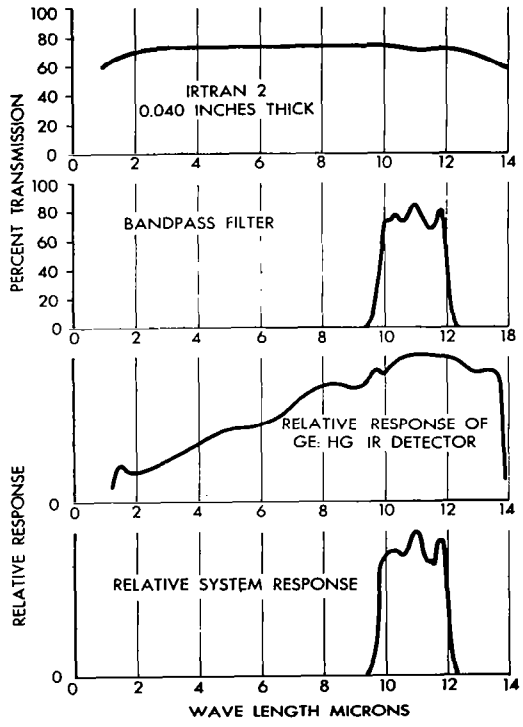


Figure 4. Transmission response of the infrared detector system.

The configuration of the detector assembly is shown in Figure 3. The incoming beam from the Newtonian flat was interrupted by a polished-aluminum reflecting chopper which reflected the radiation onto the aperture of the infrared detector. Behind the aperture were a series of f/5.6 baffles and a 10-12 micron interference filter*. A cone channel condenser finally transferred the radiation onto the mercury-doped

*Manufactured by Optical Coating Laboratories, Incorporated, Santa Rosa, California.

germanium photodetector†. The transmission response of the infrared system is shown in Figure 4. This system was mounted in a Linde LNI-15D dewar, which had an inner reservoir for the liquid hydrogen or neon used to cool the detector, and a liquid nitrogen jacket. The assembly from the aperture to the detector was maintained at the lower temperature, so that very little background radiation fell on the detector; its resistance in use was usually between 50 and 100 megohms. Although the f/5.6 baffles should nominally restrict the view of the unit only to radiation from the primary (except for that coming from the mirrors, the Newtonian struts, and the Cassegrainian hole), calculations showed and laboratory tests confirmed that diffraction at the aperture widened the field of view somewhat beyond the f/5 primary beam. Further, although the aperture size defined a resolution diameter of 8" arc or 10" arc on the Moon, it is to be noted that the diameter of the Airy disk for a 60-inch telescope at 10 microns is 3" arc.

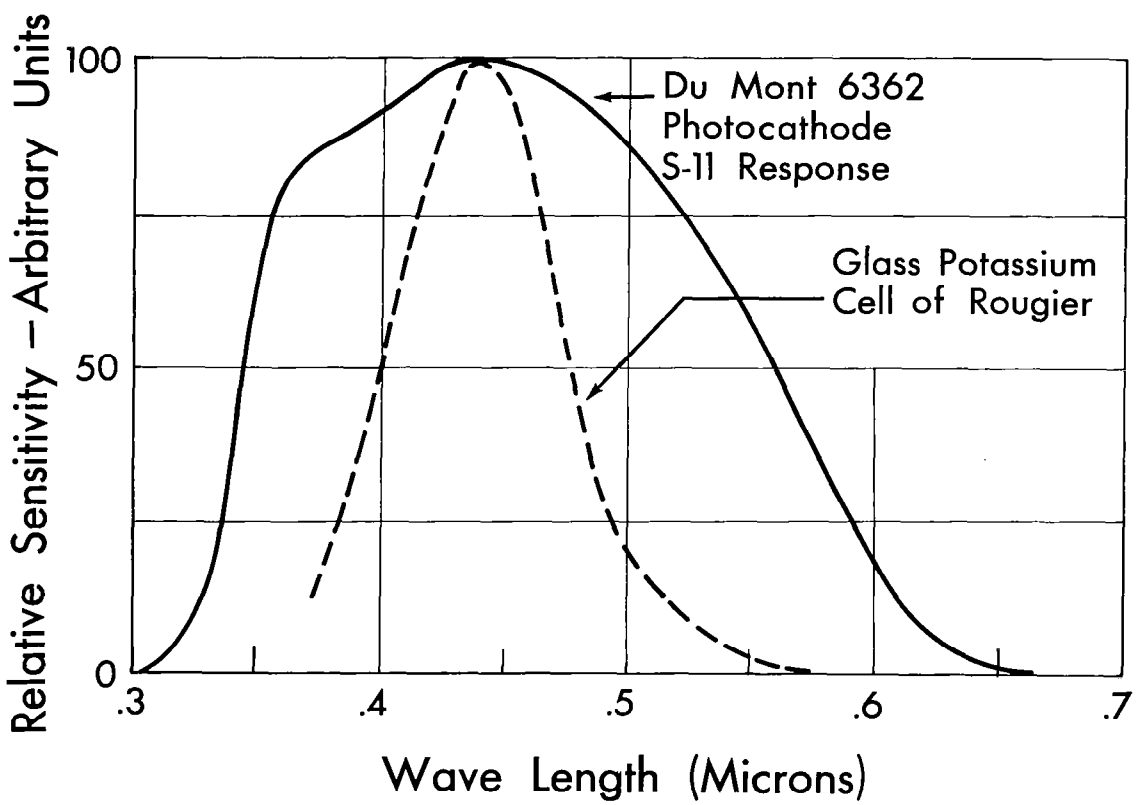


Figure 5. Relative response of the photomultiplier system compared with that used by Rougier.

†Manufactured by Texas Instruments, Dallas, Texas.

The detector used for the visible radiation was a Dumont 6362 photomultiplier with an S-11 photocathode. Its peak response at 4450 Å was close to that used by Rougier (1933) for his measurements of the integral brightness of the Moon as a function of phase (see Figure 5). The photomultiplier had the same aperture-baffle assembly as the infrared detector, but with the shorter wavelength, diffraction effects should be smaller by a factor of 20. Because of the relatively large size of the photocathode, no cone channel condenser was used.

The chopping rate of 430 Hz was chosen to be more than an order of magnitude greater than the bandwidth of the information, determined by the dwell time of the detectors (0.015 sec). The detector signals, amplified by Tektronix Model 122 preamplifiers, were synchronously rectified and smoothed. Since the high impedance of the infrared detector together with lead capacitance limited the time response, a biasing circuit incorporating an ac-coupled low-impedance shunt on the input to the preamplifier (Holter, Nudelman, Suits, Wolfe and Zissis, 1962) was used. The load and shunt resistors were adjusted to obtain the greatest output signal. The voltage across the detector was of the order of 100 volts.

The detector-chopper apparatus was mounted in the scanner assembly which provided a rectangular scan raster over the lunar image. The rapid traverse motion was achieved with a lag screw driven by a reversible synchronous motor. A microswitch at each end of a traverse activated the following turnaround sequence:

(1) A position-marker voltage (of positive polarity for one side, negative for the other) was turned on and recorded for position information.

(2) The traverse motor power was turned off and brakes applied.

(3) The advance motor was activated, driving a lag screw which advanced the detector apparatus vertically one sensor diameter.

(4) The brakes were inactivated and the traverse motor turned on in the opposite direction.

(5) The traverse motor was up to speed when the position-marker microswitch was cleared, at which time the position-marker voltage was turned off.

The traverse speed corresponded to 540" arc/sec for the data taken at Mt. Wilson and 700" arc/sec for those taken in Egypt.

The biasing circuit and preamplifier for the infrared detector were mounted on the detector apparatus to minimize noise due to cable motion. The remainder of the electronics, the control panel for the scanner, the tape recorder, and calibration equipment were installed in a trailer parked adjacent to the telescope dome at Mt. Wilson, and on the dome floor at Kottamia in Egypt.

IV. CALIBRATION

The detectors were not calibrated absolutely with respect to reference sources beyond the atmosphere. Thus the reported values of the photometric brightness and the brightness temperatures may have some error, depending on the accuracy of the reference data. Nonetheless, relative differences in signal on any one scan are reliable to a fraction of a percent of the span in signal. Further, if at a later date, accurate absolute data become available for calibration, the values can be adjusted appropriately.

A. Photometric

The photometric data were calibrated with respect to the measurements by Rougier (1933) of the integral brightness of the Moon as a function of phase. The procedure used, similar to that employed by Van Diggelen (1959), consisted of equating the average brightness $\overline{b}$ (the integral brightness divided by the fraction illuminated) to the average signal at that phase. Actually, the opposition effect for phase angles less than 5° (Gehrels et al., 1965) was incorporated into the calibration, the integral brightness at zero phase being equated to a value of 100. Rougier's results, with a suitable multiplicative factor, were matched at ±5° phase angle (Figure 6). In this manner a calibration constant was calculated for each scan program so that a consistent set of measurements through a lunation was obtained. In the units used here for brightness, the value 100 represents the average normal albedo over the lunar disk.

The average signal $\overline{V}$ for the photometric scan data on a particular scan program was obtained by calculating the average voltage of all

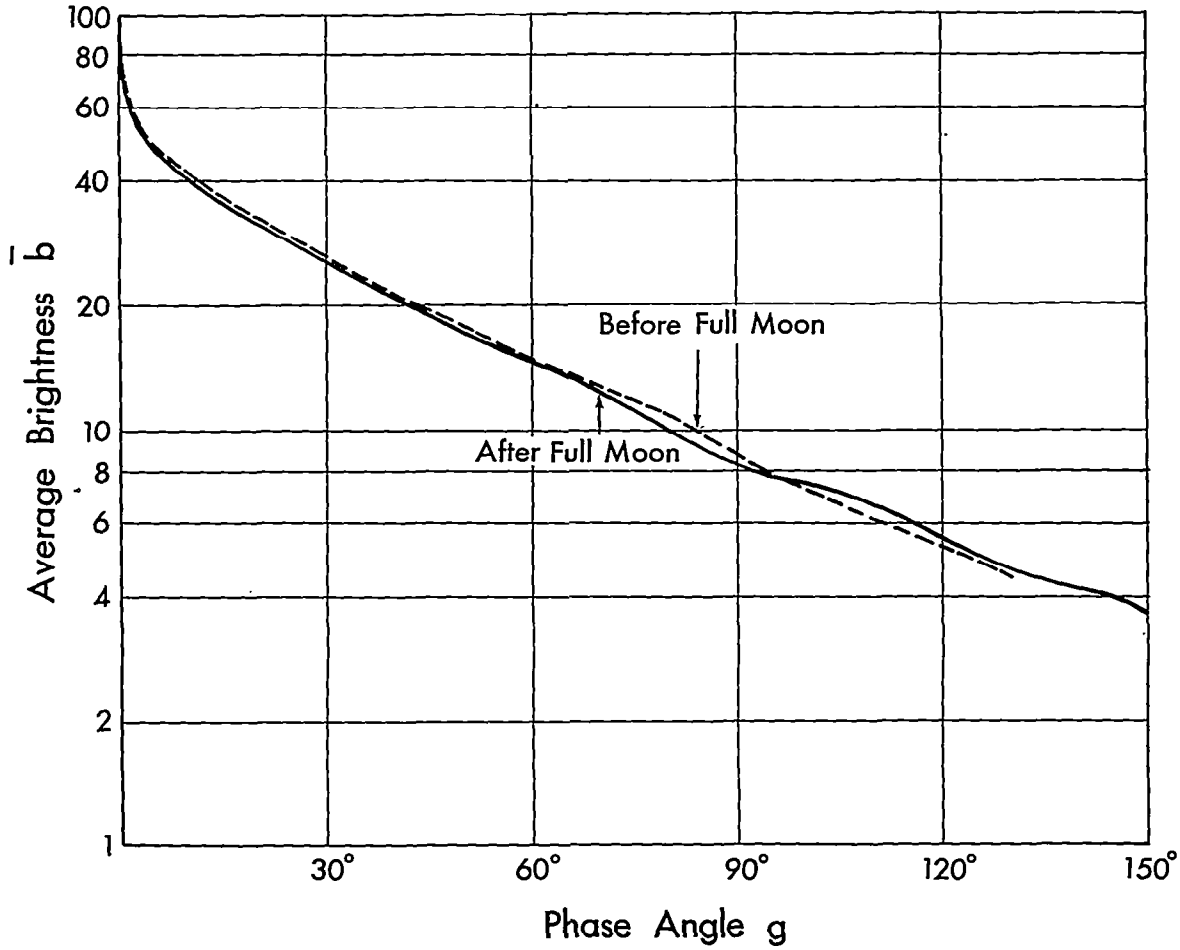


Figure 6. Average brightness of the lunar disk obtained from Rougier's measurements by dividing by the fraction of the Moon illuminated. The opposition effect of Gehrel's for phase angles less than 5° has been included.

points having values greater than a series of "threshold" voltages, V_t, which were taken to be approximately 1, 2, 4, 6, 8, ••• percent of the maximum voltage obtained in the scan. Typical plots for scan programs 8H* and 31F are shown in Figure 7a,b. As is to be expected, the average voltage slowly decreases as V_t decreases; when V_t nears zero, however, $\bar{V}$ drops rapidly because of the inclusion of sample points in the aureole near the bright limb. Hence, $\bar{V}$ was obtained by a straight-line extrapolation to zero of the data in the region above the rapid decrease near zero.

*The scans with the letter H were obtained in Egypt; all others were obtained at Mt. Wilson. The number indicates the sequences in which the scans were made.

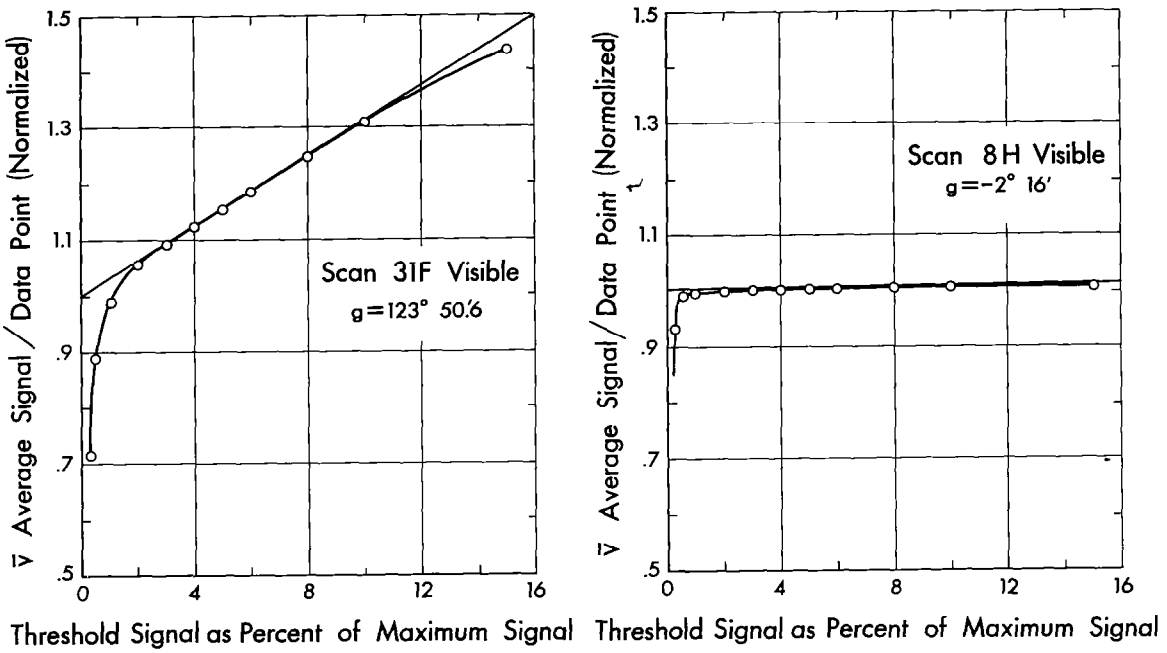


Figure 7a,b. Curves showing average value of signal per data point above a given threshold value. The average voltage $\bar{V}$ for the photometric data was determined by a straight-line extrapolation to zero threshold value.

A source of error in the above procedure is the inclusion of sample points in the average where the detector aperture straddled the bright limb. It is estimated that the calibration constant will be higher than it should be because of this effect by the order of a fraction of a percent. While possible in principle to calculate a correction, it was felt to be unwarranted since Rougier's data were probably no more accurate. Further, his data were taken for different librations of the Moon which did not necessarily correspond to those for our measurements. While possible to correct for this effect as well (from a knowledge of the variation of albedo over the Moon), no attempt was made to do so at this time.

It was discovered, upon completion of the measurements in Egypt, that the preamplifier for the photomultiplier had been inadvertently used there at a gain setting such that a nonlinearity was present at the higher signal levels. An attempt was made to use the measurements of Fedoretz (1953) on the brightness of selected lunar regions for the

determination of a calibration curve for these scans. However, a number of difficulties were encountered, including errors in her selenographic positions, based partially on the fact she used as reference the map of Beer and Mädler (1837) which shows considerable discrepancies when compared with recent sources such as the ACIC Lunar Mosaic. Therefore, this nonlinearity was removed by measuring the brightness of 50 points having a large range of albedo near the lunar meridian on Scan 36G and reading the voltage values for the same points on scans 1H, 5H and 8H.

B. Infrared

The absolute calibration of an infrared system through the atmosphere embodies a number of difficulties (Ingrao et al., 1965), the most troublesome being the losses in the optical system and in the atmosphere. In principle, the former could be determined by use of an extended blackbody calibration source external to the telescope (La Rocca, 1959), although there are practical difficulties when telescopes of large aperture are used, as in this work. The determination of atmospheric losses would depend on knowledge of the atmospheric composition (particularly water vapor), pressure, and temperature with altitude, the zenith angle of observation, and the extinction law as a function of wavelength over the sensitive region of the detector-filter combination. Since much of this information is not available, a method of calibration was adopted based on a calculated value of the brightness temperature of the subsolar point when visible. When subsolar-point data was not used, the calibration took into account atmospheric and optical losses and the night-to-night variation of detector sensitivity in a manner described below.

The voltage signal output V (above the background sky value) obtained from the detector when pointed at a region of the Moon with brightness temperature T_M is

$$V(T_M) = C_e C_o \int W(T_M,\lambda) t(\lambda) D(\lambda) d\lambda \qquad (1)$$

where $W(T,\lambda)$ is Planck's function, $t(\lambda)$ the transmission of the atmosphere, and $D(\lambda)$, the response of the detector filter combination. The

constant C_o depends on the optics with its losses (assumed independent of wavelength λ) and C_e depends on the sensitivity of the detector and the gain of the amplifiers. It was assumed that C_o was constant for each telescope over the observational period; however, C_e could change from night to night because of changes in the sensitivity of the detector and the gain setting of the amplifier (which was adjusted so that the maximum infrared signal approximated the span available on the tape recorder).

In the integral in Equation (1), $D(\lambda)$ is known from the characteristic curves supplied by the manufacturers. The atmospheric transmission $t(\lambda)$ was determined by assuming the square root law to hold in the 10-12 micron window and by using the transmission data of Altshuler (1957). These data consist of curves of the transmission of the atmospheric components CO_2, H_2O, and O_3 as a function of wavelength. With this information, the integral in Equation (1) was evaluated on a computer for a matrix of values of temperature T_M, air mass (corresponding to varying zenith angles), and precipitable water. An analysis of the results showed that the temperature-voltage relationship was closely approximated (to about 0.1°K) by the following equation

$$T_M = \frac{L(z,PW)}{\log[K/V(T_M) + 1]} \qquad (2)$$

which is simply Plank's function at a single wavelength solved for temperature. This is not surprising considering the relatively narrow bandpass of the filter. The constant L is related to the wavelength in the window for which Equation (2) best approximates the integral. Its value depends on the zenith angle and precipitable water (PW) in the observational path, but only slightly (the extreme values of L used in this report differ by only 0.35 percent.

The constant K in Equation (2) can be calculated for each scan program where the subsolar point was visible by substituting its observed infrared signal and a calculated value of brightness temperature. The latter was determined knowing the Sun-Moon distance and using a value of 2.00 cal/cm^2 min. for the solar insolation at 1 AU. A correc-

tion was made for the local albedo (based on the observed variation of temperature with changes in albedo for points near the subsolar point on Scan Program 8H) and an allowance of 0.5°K was made for conduction into the surface (Sinton, 1962). Finally, a correction was made for the directional characteristics of the infrared radiation emitted by the subsolar point using measurements of the heat emitted by it as a function of a phase (Sinton, 1962).

For those phases for which the subsolar point was not used, the constant K must be determined in an alternate manner. For this, the calibration of the detector made nightly immediately following the completion of the scan program was utilized. This consisted of pointing the telescope at the sky and reading the voltage from the detector with the reference blackbody (see Figure 3) in place (at a measured ambient temperature T_{cal}). This blackbody was then replaced by one cooled to liquid nitrogen temperature T_{N_2} and the voltage read again. The difference in voltages, ΔV_{cal}, is

$$\Delta V_{cal} = C_e C_o' \left[\int W(T_{cal},\lambda) D(\lambda) d\lambda - \int W(T_{N_2},\lambda) D(\lambda) d\lambda \right] . \qquad (3)$$

The second integral is negligible compared to the first; C_e has the same value in Equation (3) as in Equation (1), but C_o' is different than C_o because of the difference in the optics between the calibrating blackbody and the telescope.

The approximation used in Equation (2) is equivalent to

$$\int W(T_M,\lambda) t(\lambda) D(\lambda) d\lambda = C t_{av}(z,PW) (10^{L(z,PW)/T_M} - 1)^{-1} \qquad (4)$$

where C is a constant, $t_{av}(z,PW)$ the average atmospheric transmission through the window, and the last factor the temperature-dependent portion of Planck's function. Thus Equation (1) can be written

$$V(T_M) = C_e C_o C t_{av}(z,PW) (10^{L(z,PW)/T_M} - 1)^{-1} \qquad (5)$$

In the same manner, Equation (3) becomes

$$\Delta V_{cal} = C_e C'_o (10^{L_o/T_{cal}} - 1)^{-1} \tag{6}$$

since the atmospheric transmission during calibration $t_{av} = 1$; L_o is the value of this constant for zero air mass and precipitable water.

Dividing Equation (6) by (5) and solving for T_M, we find

$$T_M = L(z,PW)/\log\left[kt_{av}(z,PW)\,\frac{\Delta V_{cal}}{V(T_M)}\,(10^{L_o/T_{cal}} - 1) + 1\right] \tag{7}$$

where $k = C_o/C'_o$. Comparing Equation (7) with Equation (2), we note that

$$K = kt_{av}(z,PW)\Delta V_{cal}(10^{L_o/T_{cal}} - 1) \tag{8}$$

The calibration for a particular scan program where the subsolar point is not visible is thus effected by measuring ΔV_{cal} and T_{cal} that night and substituting the appropriate values of t_{av} and k in Equation (8).

The transmission factor $t_{av}(z,PW)$ was determined on a computer for a matrix of values of z and PW at the same time L(z,PW) was determined. The constant k, which measures the difference in the optics and losses between the calibration and measuring modes, was determined from the scans where the subsolar point was visible. For each of these scans the calibration data ΔV_{cal} and T_{cal} and the values of K and $t_{av}(z,PW)$ were substituted in Equation (8) and solved for k. The average value of k calculated this way had a standard deviation of the mean equal to ±5.3 percent.

For each scan program, the topocentric value of the zenith angle calculated for the disk center at the midpoint of the scan was used for z. To estimate the precipitable water PW, ground-level readings of the relative humidity and temperature were employed at both locations. The precipitable water zenith (PWZ) was calculated using the formula of

Solot (1939)

$$PWZ = \frac{1}{g} \int_{o}^{p_o} q\,dp \qquad (9)$$

where q is the mixing ratio (mass water vapor per mass air), p the pressure, and g the acceleration of gravity. The humidity measurement gave a value of q at p_o, the pressure at ground level; for the higher altitudes, a variation of q in the tropopause suggested by Gutnick (1962) was used. The validity of this method is indicated by its application to the measurements of Adel (1958) in which he obtained a correlation between his determination of PWZ by near infrared observations on the Sun and ground-level water-vapor measurements at Flagstaff, Arizona. PWZ values calculated for the altitude of Flagstaff as a function of ground-level water vapor using the method described here agreed very closely with Adel's observed values. For some scan programs at Mt. Wilson, satisfactory radiosonde humidity measurements were available from the routine balloon flights made from Santa Monica, California (28 miles distant from Mt. Wilson). In these cases the PWZ's were calculated by a direct integration of Equation (9) and averaged with the values obtained from the ground-level readings. Finally, the precipitable water PW in the observational path was calculated from the PWZ using the topocentric zenith angle for each scan program.

C. Discussion of Error

Error in the measurements will be considered first with respect to the system noise, which gives a measure of how small a difference in brightness or temperature can be reliably detected. Secondly, estimates will be made of the absolute error only in terms of those parameters which are considered to contribute significantly.

The system noise, originating from electrical, detector, or sky background sources, was determined for both the visible and infrared data from data when the detectors were off the Moon (but not when the scanner was in the turnaround sequence). For approximately 60 data points in each corner of the scan format, a standard deviation was computed; the root mean square of these four values then was used as a

measure of the noise. For the visible data, this value was converted directly to brightness units (Table II); the average brightness noise for the 23 scan programs is 0.059 units. The noise was also expressed in terms of the percent error of the average brightness for each scan;

TABLE II

RMS NOISE BRIGHTNESS UNITS FOR VISIBLE SCAN PROGRAMS			
Scan Number	Brightness Units of RMS Noise Δb	Average Brightness* (Full Moon 100) $\overline{b}$	Percent Error $\Delta b/\overline{b}$
9C	0.041	4.90	0.83
12C	0.041	5.75	0.70
14C	0.063	6.90	0.91
15C	0.029	8.45	0.35
22E	0.052	9.00	0.58
25E	0.042	13.80	0.31
28E	0.041	21.40	0.19
33G	0.085	26.90	0.32
1H	0.104	34.30	0.31
36G	0.106	37.10	0.29
5H	0.064	51.90	0.12
8H	0.069	57.70	0.12
37G	0.116	38.80	0.30
39G	0.063	28.20	0.22
41G	0.095	21.00	0.45
17D	0.075	18.10	0.42
19D	0.055	14.10	0.39
20D	0.058	10.70	0.55
21D	0.044	8.25	0.54
29F	0.029	7.45	0.39
30F	0.029	6.38	0.45
31F	0.021	5.20	0.41
32F	0.044	4.36	1.01

*Obtained from Figure 6.

the values are generally a fraction of a percent. For the infrared data, a minimum detectable noise temperature was calculated for each scan program which corresponds to that temperature determined from a voltage equal to the root-mean-square noise (Table III). Since the temperature relationship is nonlinear with voltage, the error calculated at a number of temperatures is also included in the table. At 400°K, the error is a small fraction of a degree; at approximately

TABLE III

RMS NOISE TEMPERATURE VALUES FOR INFRARED SCAN PROGRAMS

Scan No.	Min. Noise Temp. °K	Temperature Value of RMS Noise ΔT for Given Temperature T							
		T=400°K	T=350°K	T=300°K	T=250°K	T=200°K		T=150°K	
		±ΔT	±ΔT	±ΔT	±ΔT	+ΔT	-ΔT	+ΔT	-ΔT
9C	†								
12C	150.3	0.49	0.62	0.87	1.45	3.4	3.6	11.	23. *
14C	140.4	0.27	0.34	0.47	0.79	1.9	1.9	8.0	13.
15C	132.8	0.15	0.19	0.27	0.46	1.1	1.1	4.9	6.4
22E	136.9	0.21	0.26	0.37	0.62	1.5	1.5	6.5	9.2
25E	132.2	0.15	0.19	0.26	0.44	1.0	1.1	4.8	6.1
28E	135.4	0.19	0.23	0.33	0.56	1.3	1.4	5.9	8.0
33G	141.2	0.28	0.35	0.49	0.83	1.9	2.0	8.3	14.
1H	135.4	0.18	0.23	0.33	0.55	1.3	1.3	5.8	8.0
34G	137.5	0.22	0.27	0.38	0.64	1.5	1.6	6.7	9.7
5H	136.6	0.20	0.25	0.36	0.60	1.4	1.5	6.3	8.9
8H	137.8	0.22	0.28	0.39	0.65	1.5	1.6	6.8	9.9
37G	137.4	0.21	0.27	0.38	0.64	1.5	1.6	6.6	9.5
39G	134.8	0.18	0.22	0.31	0.53	1.3	1.3	5.6	7.6
41G	137.7	0.22	0.27	0.38	0.65	1.5	1.6	6.7	9.8
17D	133.1	0.16	0.20	0.28	0.47	1.1	1.1	5.1	6.6
19D	133.4	0.16	0.20	0.28	0.48	1.1	1.2	5.2	6.7
20D	141.0	0.27	0.34	0.48	0.81	1.9	2.0	8.2	13.
21D	132.5	0.15	0.19	0.26	0.45	1.1	1.1	4.8	6.2
29F	128.9	0.11	0.14	0.20	0.34	0.81	0.82	3.8	4.5
30F	135.8	0.19	0.24	0.34	0.57	1.3	1.4	6.0	8.3
31F	132.9	0.15	0.19	0.27	0.46	1.1	1.1	5.0	6.4
32F	130.1	0.13	0.16	0.22	0.37	0.89	0.91	4.1	5.1

†See VI. REMARKS, Scan 9C.

*On Scan 12C, T = 155°K

200°K the error is about one degree. It is to be noted that the above method for calculating the reproducibility of the data does not include the effects of changes in atmospheric transparency during a single traverse; in some cases (see, for instance, the isotherms for scan 37G) excessive structure in the rapid traverse direction may arise from this source.

The absolute error of the photometric calibrations is determined by the accuracy of Rougier's integral brightness values with phase and the method for determining the average signal for each phase. While it is not possible to determine the absolute accuracy of Rougier's data,

his error can be judged from the scatter of his individual measurements with phase; it is estimated that the deviations are of the order of ±5 percent or less of the value. In obtaining the average signal $\overline{V}$, errors can result from uncertainties in the extrapolation process described in the calibration section. For each scan program, this error was estimated, the percentage error being less the smaller the phase angle. It was determined that the resulting percentage error in brightness units for any one scan program is inversely proportional to the average brightness $\overline{b}$ (numerically equal to ten divided by the average brightness). Thus the error for scan 1H from this source is about 0.2 percent, and for scans made near the quarter Moon about 1 percent. A further source of error in the determination of the average signal $\overline{V}$ arises from the inclusion of sample points where the detector aperture is straddling the limb. For the full Moon, it was estimated that the brightness units would be high by 1 percent because of this effect; for the quarter Moon, they would be high by 1.6 percent. No corrections were made for this effect, however.

The error in the infrared brightness temperatures, where the subsolar point was used for a calibration point (where $|g| < 80°$), arise principally in the calculated value of the subsolar-point temperature. One possible source of error is the use of Sinton's data for the variation of the brightness temperature of the subsolar point with phase. For one thing, his measurements were made in a band 1.5 microns wide centered on 8.8 microns, whereas our band was 2 microns wide centered on 11 microns — it is not clear just how wavelength dependent this function is. Further, there is a certain amount of scatter in his data; this scatter, amounting to an rms uncertainty ±5.2°K from the mean curve drawn through the points, has been used in Figure 8 in calculating the uncertainty arising from this source as a function of temperature. As is to be expected, it is greatest at the high temperatures, decreasing to a fraction of a degree (considerably less than the system noise) at 150°K. Finally, in calculating the subsolar point temperature, 0.5°K was subtracted from the value to allow for conduction into subsurface. Actually, this value applies for a homogeneous

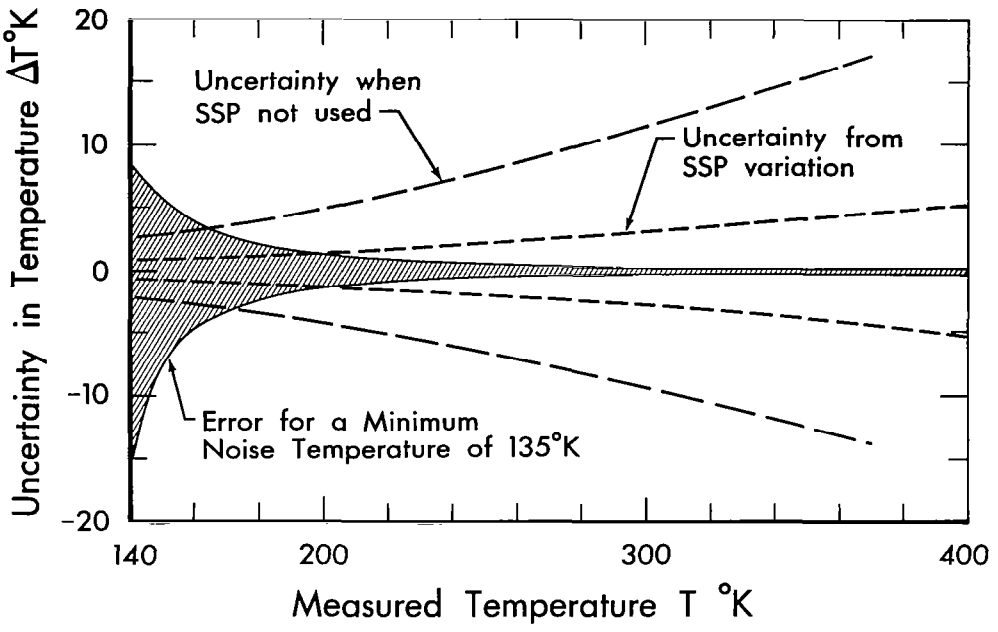


Figure 8. Uncertainty in the brightness temperature due to the rms deviation in the subsolar-point data of Sinton (1962) is shown by the short dash line for $g < |80°|$. Uncertainty in the brightness temperature when subsolar data not used is indicated by the long dash line. The shaded area shows the error in brightness temperatures for a minimum noise temperature of 135°K.

model of the surface with temperature-independent properties. There is recent evidence (Linsky, 1966) that a significant amount of the energy transport is by radiation, in which case the temperature should even be lower at local noon. On this basis estimates have been made that for pure radiation transport into the lunar surface approximately 3°K should be subtracted. While it is unlikely that such an extreme case realistically describes the energy-transport mechanism, it should be borne in mind that the reported temperatures may be several degrees high because of the manner in which conduction into the surface was accounted for.

For the temperature calibrations where the subsolar point was not used ($|g| > 80°$), use was made of an "optical-loss factor" actually calculated from the data when the subsolar point was used. A value of this factor of 1.66 was obtained, with a standard deviation of ±15 percent. Uncertainty in the temperature using this standard deviation has

been calculated as a function of temperature, and is also shown in Figure 8. The uncertainty from this source is seen to be considerably greater than that obtained when it was possible to use Sinton's subsolar-point data for calibration.

V. DATA REDUCTION PROGRAM

The analog data were digitized, two channels at a time, on an Epsco A/D Converter at 312.5 samples per second per channel. The infrared or visible channel was alternately sampled with the position-marker channel, which furnished the time base by indicating the start and stop time for each traverse, the elapsed time for each traverse and the time on the sky during the turn-around sequence. For each scan program, two digitized tapes were therefore produced, infrared/position and visible/position, which were then formatted for programming on an IBM-7094 computer and processed separately according to individual requirements. Several computer routines used during the data reduction are described below.

A. Filter Routine

The infrared and visible analog signals were smoothed with an R-C filter during the original measurements, and again with a 200-Hz Bessel filter on the input to the A/D converter. For the data taken in Egypt, Bessel filters were used on the inputs to the analog tape recorder. The characteristics for the numerical filter used on the digital data were chosen after a study of the power spectrum of the original analog data, of which Figure 9 is a typical example (similar plots were obtained for the infrared data). It can be noted from the power spectrum that the information was concentrated below 30 Hz.

The peaks at 860 Hz and 120 Hz result from the synchronous rectification process, which doubles the 430-Hz chopping rate and 60-Hz pickup. The characteristic of the numerical filter used is shown in Table IV. After the filtering process, the digital data are converted to volts using automatic voltage calibration data placed on the original infrared and visible channels before and following each scan pro-

gram. This calibration signal was inserted directly into the tape-recorder inputs which, in effect, corrected any nonlinearity in the record-reproduce-digitize sequence.

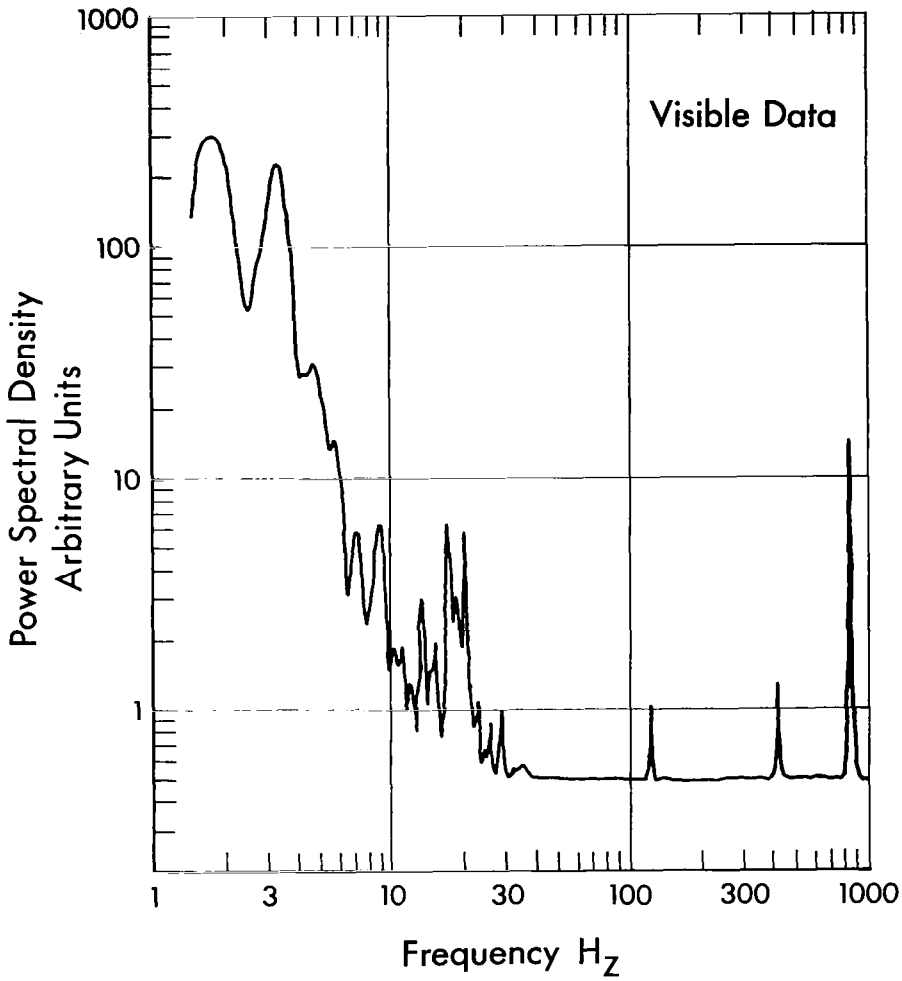


Figure 9. Power spectrum from visible data of a typical traverse across the lunar disk.

TABLE IV

NUMERICAL FILTER CHARACTERISTICS

A lowpass filter was used with a nominal 41.5-Hz cutoff frequency and 62.5-Hz termination frequency. 41 sample points were used (21 non-redundant weights); with the sampling frequency of 312.5 sec^{-1}, the following roll-off characteristics apply:

0.003	dB	up	at	40 Hz
0.089	dB	down	at	41 Hz
0.26	dB	down	at	42 Hz
1.58	dB	down	at	46 Hz
4.95	dB	down	at	51 Hz
11.3	dB	down	at	56 Hz
29.8	dB	down	at	62 Hz
37.9	dB	down	at	63 Hz

B. Sky Correction Routine

Since the net signal voltage on the Moon above the sky background was desired, an average voltage value for the sky was determined while the scanner system was off the Moon and in the turn-around sequence at the end of each traverse for about 1.6 seconds. Average sky values were calculated before the beginning and just after the end of each traverse. The sky value obtained at the end of one traverse was therefore the sky value for the beginning of the next traverse. If these two values differed by less than ¼ percent of the maximum net voltage obtained on the Moon in the whole scan program, the average of the two was used for subtraction on that particular traverse. If the two average sky values differed by more than this amount, a linear interpolation of the sky value along the traverse was used for subtraction. Since the time between successive sky-value determinations was about five seconds, the above method adequately compensates for sky drifts occurring in this period or longer.

C. Line-Shift Routine

When the original analog data were smoothed with an R-C filter, a small phase shift was introduced. Since the scan format was such that successive traverses were in opposite directions, the filter smoothed successive traverses in opposite directions. The net effect, therefore, was that every other traverse was somewhat shifted resulting in contours with a serrated edge. Correction of this shift was accomplished by choosing a certain contour level near the bright limb and computing the every-other-line shift necessary to produce a smooth circular-limb contour.

D. Level-Search Routine

This routine searched the corrected, calibrated and shifted data for prescribed voltage to be printed out for contouring. The level separation was usually chosen to be about one percent of the maximum signal.

E. Print Routine

The prescribed voltage levels were assigned coded symbols, and the positions typed out on standard 11" x 15" continuous interfold paper. Successive typed lines corresponded to successive traverses in the scan program. Since only 10 inches of each paper width was used, a series of charts, corresponding to strips on the lunar disk perpendicular to the traverse direction, was necessary to present all the data. The successive lines were printed $^1/_4$ inch apart for the Mt. Wilson data, and $^3/_8$ inch for the Egyptian data. Since there were 10 discrete print positions per inch along a typed line, the error possible here (±0.05 inch) corresponded to ±1.4" arc and ±1.33" arc, respectively. Further, in many cases more than one of the prescribed voltage levels was within the 0.1-inch space devoted to a print position; in such cases, the voltage level closest to the center of the print-position space was printed.

The charts were printed on two-part carbonless paper, and the contour lines manually drawn on the copy printed in blue. Thus, when the contours were photographed using "drop-out" film (insensitive to blue), the symbols dropped out, leaving only the contour lines in most cases. Usually only every other level was drawn.

F. Listing Routines

At certain junctures in the computer reduction program, a listing of the data was printed out. For example, a listing of the raw digitized data was used to trace down any unexplained noise spikes. A listing of the unfiltered data could be used to evaluate the effect on the data caused by filtering. For each scan program, the filtered voltage value for every data point was routinely listed. Because the contour levels were separated by fixed amounts, it is necessary to refer to this listing if the maximum voltage value is desired for any given selenographic feature, which, in general, falls between contour levels.

G. Reduction Summary

Certain data were regularly abstracted and listed for each scan program. Averaged sky-background values were listed for the right and left ends of each individual traverse. The number of data points per traverse line was listed to provide an indication of the consistency of the scanning speed. A variation of one data point is expected because of the digitizing method. Table V shows a listing for traverse lines 160 through 180 for scan 39G. The column NO. SKY PTS indicates how many data points were obtained when the scanner was in the turn-around sequence at the end of a traverse. Successive pairs of LEFT-SKY and RIGHT-SKY values appear because the scanner moves in opposite directions on successive traverses; e.g., the sky reading at the end of traverse 171 is the sky reading for the start of traverse 172.

TABLE V

TRAVERSE DATA FOR A PORTION OF SCAN PROGRAM 39G

TRAVERSE LINE	NO. DATA PTS/TRAVERSE	NO. SKY PTS	VOLTS LEFT SKY	VOLTS RIGHT SKY
160	1396	527	0.283719	0.280599
161	1395	519	0.283719	0.280548
162	1396	521	0.284311	0.280548
163	1394	525	0.284311	0.280765
164	1396	531	0.285349	0.280765
165	1395	520	0.285349	0.283149
166	1395	532	0.286276	0.283149
167	1395	528	0.286276	0.282301
168	1395	542	0.285691	0.282301
169	1395	527	0.285691	0.282651
170	1396	528	0.285198	0.282651
171	1395	532	0.285198	0.282363
172	1396	538	0.285543	0.282363
173	1395	522	0.285543	0.282073
174	1396	530	0.284931	0.282073
175	1395	527	0.284931	0.282607
176	1397	532	0.284577	0.282607
177	1395	527	0.284577	0.282540
178	1396	526	0.285358	0.282540
179	1395	537	0.285358	0.283804
180	1396	538	0.288233	0.283804

The automatic voltage-calibration values for scan 39G are shown in Table VI. The pre-test and post-test calibration digits are averaged and converted to voltage. The calibration level number corresponds to a change in the modulation of the FM recorder in steps of 5 percent up to the ±40 percent maximum modulation. In order to facilitate the photometric calibration, the average signal/data point obtained in each visible scan above a series of threshold voltages (see calibration section) was computed and printed out.

TABLE VI

AUTOMATIC CALIBRATION DATA FOR SCAN PROGRAM 39G

Calibration Level Number	Pre-test Calibration (Digits)	Post-test Calibration (Digits)	Average Calibration (Digits)	Average Calibration (Voltage)
1	213.89	217.48	215.69	0.000
2	299.46	302.76	301.11	0.175
3	392.28	395.22	393.75	0.350
4	489.03	492.39	490.71	0.525
5	587.22	591.91	589.57	0.700
6	688.26	691.73	689.99	0.875
7	788.99	791.78	790.39	1.050
8	891.23	894.89	893.06	1.225
9	1097.51	1101.81	1099.66	1.575
10	1198.97	1203.04	1201.01	1.750
11	1300.13	1304.92	1302.53	1.925
12	1403.41	1406.60	1405.01	2.100
13	1499.29	1503.96	1501.63	2.275
14	1600.56	1605.29	1602.93	2.450
15	1697.89	1701.84	1699.87	2.625
16	1790.29	1793.98	1792.14	2.800

H. Automatic Contour Routine

During the data reduction of each scan program, a special tape was written which could be used to produce punched tape for automatic contouring of the visible or infrared data on a Universal Drafting Machine Orthomat X-Y plotter. A full-Moon scan requires 60,000 feet of punched tape and takes 36 hours to draw 50 levels. Certain selected regions have been automatically contoured; examples are shown in figures 10 and 11. The majority of contouring was done manually; however, visible scans 1H, 5H and 8H, and infrared scan 8H were contoured automatically.

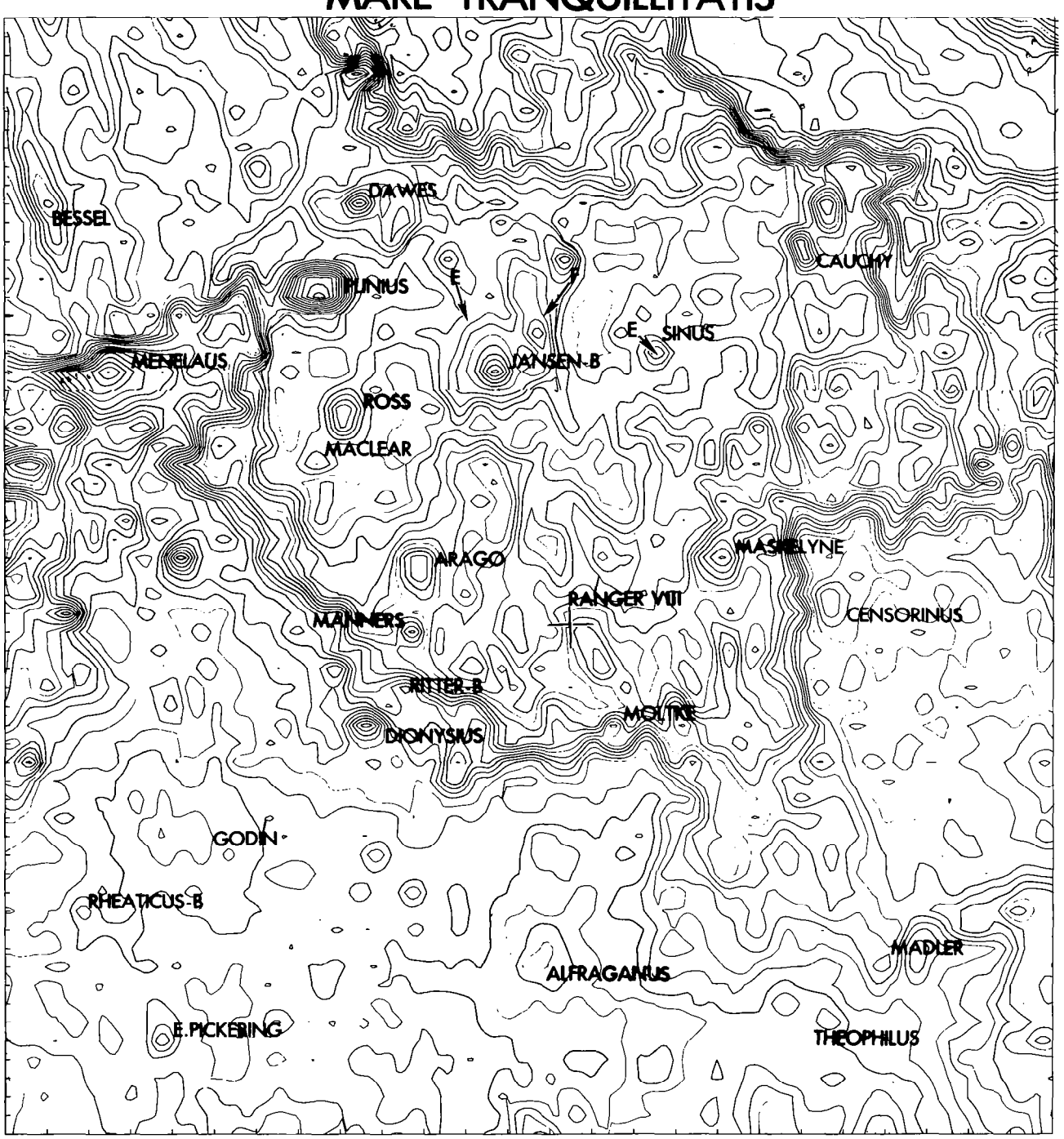


Figure 10. Isophotic contours in the region of Mare Tranquillitatis for Scan 8H.

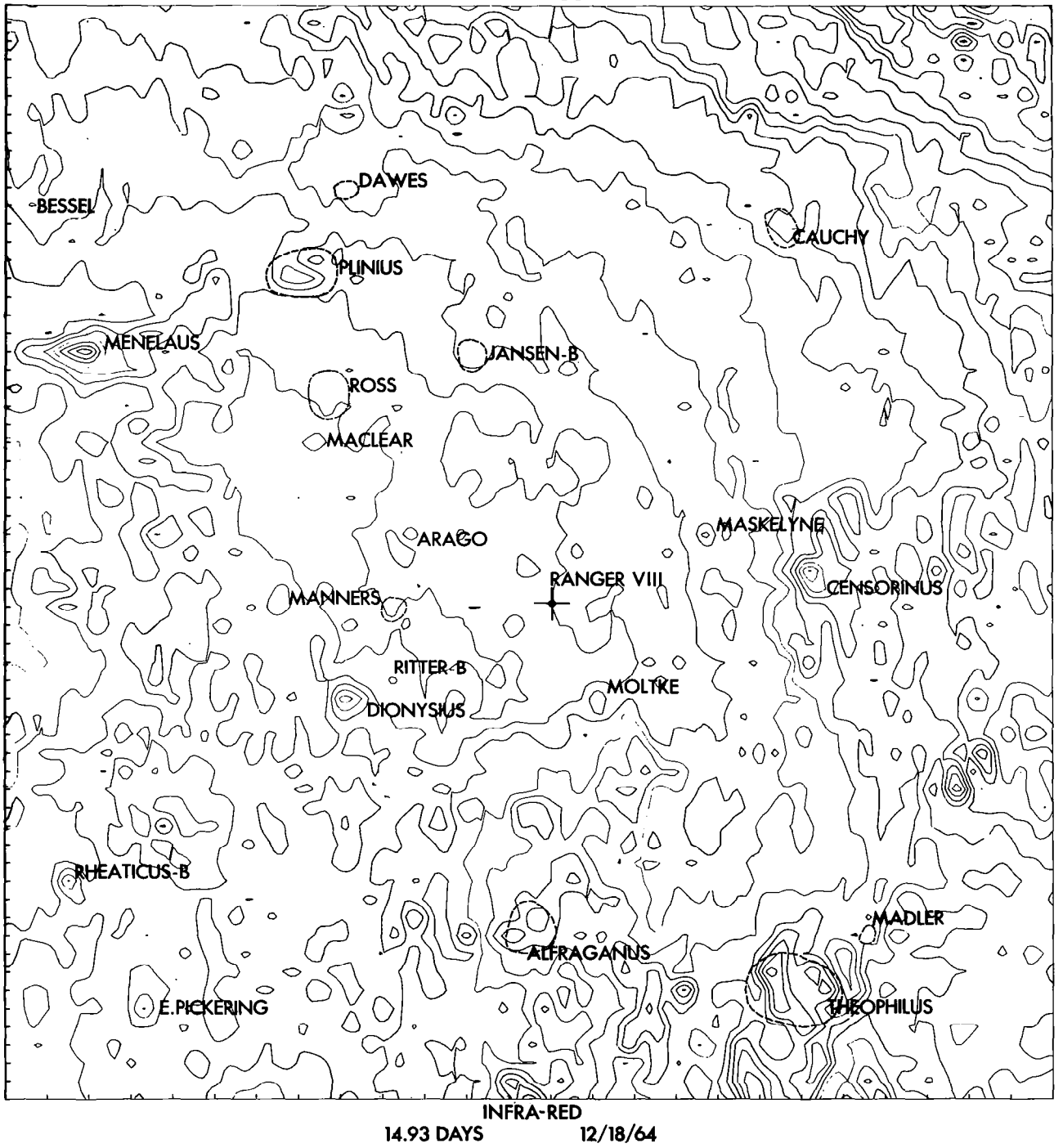


Figure 11. Isothermal contours in the region of Mare Tranquillitatis for Scan 8H.

I. Location Method

When a scan program was executed neither the position nor the rotation of the raster pattern on the Moon were accurately known. In order to provide position information, a method was devised using small lunar features apparent in the photometric contours by reason of their contrasting albedo or by shadowing. These features were identified with a photograph taken the night of each scan program by projecting the photograph onto the contours. Their standard ξ,η selenographic coordinates were taken from the catalogs of lunar features published by the Lunar and Planetary Laboratory of the University of Arizona (Arthur, 1962; Arthur et al., 1963, 1964; Arthur et al., 1965). With knowledge of the topocentric libration of the Moon for each scan program, the appropriate ξ',η' librated coordinates (on a conical projection) were then calculated. The x,y coordinates in a Cartesian reference frame for the photometric contours were read off for each of the identified features, the x coordinate being along the traverse direction. A transformation was then effected using $\xi' = a + bx + cy$ and $\eta' = d + ex + fy$ where a,b, $\cdots$ are constants to be determined. The mathematical form of the transformation allows for rotation and stretching of the lunar image (i.e., an elliptical limb shape), the latter correcting for possible errors in the scaling between the advance distance to the transverse distance in the scan raster. The constants a,b, $\cdots$ f for the transformation are determined from the ξ',η' and x,y coordinates for the reference features, employing as a criterion the minimization of the rms error between the observed and computed x,y coordinates. An iterative procedure was used, based on eliminating any reference points from the fit for which the error was three times the rms error, and recomputing the constants for the transformation. This eliminated any obvious clerical or reading errors. While only three points would be necessary to determine the constants, as few as 8 (for large phase angles) and as many as 40 were used; the rms error ranged from 1.0" arc to 3.5" arc, the average being 2.1" arc.

With the transformation determined in the above manner, librated ξ,η grids at 0.1 intervals were drawn on the Universal Drafting Machine Orthomat plotter for overlay onto photographically reduced contours. Certain other information was also plotted, such as the apparent center of the disk, the subsolar point, and the center of the selenographic grid system.

VII. REMARKS

The atlas charts are arranged in order of increasing phase starting with the five-day-old Moon (-124° phase) and ending with the 26-day-old Moon (+136° phase). Each chart is divided into the four quadrants, Northeast Quadrant I, Northwest Quadrant II, Southwest Quadrant III and Southeast Quadrant IV. There is an overlap of 0.05 ξ and 0.05 η on the quadrant sections of each atlas chart. For each phase corresponding quadrants of the visible and thermal contours are displayed on opposite pages. The title block lists the pertinent constants for each chart. The sensor resolution also indicates the separation between successive traverses.

Calibration tables are given below each quadrant section. The contour number approximately corresponds to the percentage of the maximum signal for that particular scan. In several instances the contour interval was reduced (e.g., Scan 37G) in order to present more detail. When determining a contour number for a specific location it should be noted where sharp gradients occur not all levels were drawn and that several levels may merge together. In some cases only a portion of a closed loop was drawn. Where this occurred the maximum or minimum contour number has been indicated.

Certain characteristics of the data should be kept in mind by the reader while using the atlas charts. When studying features smaller than the sensor resolution which show contrast with the environs, the signal will be diluted with signal from the environs (Shorthill and Saari, 1965). Further, the observed signal difference will be quite sensitive to exactly how the feature was intersected by the raster pattern. The photometric brightness values were determined by calibrating

with respect to Rougier's integral brightness values which were normalized to a Sun-Moon distance of 1 AU. On the other hand, the brightness temperatures refer to the particular Sun-Moon distance when each scan was made. A normalization factor is given for each scan in Table Ic to correct the temperatures to 1 AU in case brightness temperature-phase curves are plotted. In this connection, it should be noted that the scans were made at different librations of the Moon, which, unless corrected for, will cause scatter in phase curves of brightness or temperature for individual points. Finally, the reported brightness temperatures strictly speaking refer to the radiance in the 10-12 micron band measured by the detector. It is known that the Moon exhibits directional effects in the infrared (Pettit and Nicholson, 1930) undoubtedly caused by the roughness of the surface (Montgomery et al., 1966; Saari and Shorthill, 1966). It follows then that the detector actually is averaging a distribution of temperatures in its band pass; a detector operating at a different wavelength could well obtain a different brightness temperature for the same measurement. Therefore, when the isotherms are used for special purposes, a correct interpretation of the brightness temperatures may be important.

The following comments for each of the atlas charts, arranged by phase angle, note particular areas of interest or special difficulties encountered in taking the data or producing the contours.

Scan 9C (-124°) — This scan is the one closest to New Moon. Because of the lack of contrast in the isophotes for small features, only 12 points were used in the grid fit, with only a few in the northern hemisphere. Evidently the fit was not as good as others, because the contours go beyond the plotted limb by several sensor diameters in the north. It is to be noted that the isotherms do not cover the entire illuminated disk. This was caused by an erroneous offset being used for the infrared channel such that the zero of the system (when the detector was looking at the sky) was saturating the tape recorder beyond the lower linear limit of -1.4 volts. A calibration was effected by matching the temperature at a point (where the infrared voltage was read) 60.2°E from the disk center along the luminous equator to that at a point 60.2°W on scan 31F, which was a scan almost the

same phase angle after full Moon as 9C was before full Moon. Using the values of L and K in the calibration formula determined in the manner described in the calibration section, this allowed the calculation of the correct offset voltage. Temperatures were then calculated for those values of signal voltage which were in the linear range of the tape recorder; this is why calibrations are not given for the lower contour levels. Because of the offset difficulties the minimum detectable noise temperature could not be obtained.

Scan 12C (-113°) — The contours are relatively smooth in the maria, compared to the upland areas which show considerable structure, particularly in the infrared chart. This scan had the largest minimum detectable noise temperature of all the scans.

Scan 14C (-102°) — On some scans, because of the large number of levels contoured, the lines crowd together in areas of large gradients; this is evident on the infrared scan for 14C.

Scan 15C (-92°) — This scan was done very close to first quarter.

Scan 22E (-89°) — Also near first quarter, the data on several traverse lines for the visible scan were bad (evidenced by dashed contour lines) near the southeast limb.

Scan 25E (-65°) — The subsolar point, now visible on the disk, is near the area of highest temperature in the isotherms. The sun has just risen on the crater Copernicus.

Scan 28E (-40°) — The highest temperature in the isotherms is in Mare Tranquillitatis, a region north of and darker than the subsolar point.

Scan 33G (-29°) — A large number of isophotic levels were contoured resulting in reading difficulties in some areas. There is some structure in the direction of the rapid-scan motion evident in both the isotherms and isophotes, particularly in Quadrant IV.

Scan 1H (-18°) — The isophotes were automatically contoured, the isotherms hand drawn.

Scan 34G (-15°) (isotherms) and Scan 36G (-15°) (isophotes) — In

the first there was a malfunction in the visible channel, and the second in the infrared channel. These scans, however, are paired since they were done an hour apart and differ in phase angle by only ½°. In some scans, such as these, the contours were drawn on lined paper and the coded symbols may show in certain areas. Where the lines or symbols fall under a contour line, a darkening may occur which could be mistaken for a hachure mark.

Scan 5H (-4°) — As with 1H, the isophotes were automatically contoured and the isotherms hand drawn.

Scan 8H (-2°) — Both the isophotes and isotherms were automatically contoured. However, the hachure marks do not show up well on the isophotes, so a special effort was made to label more contours. This scan is of special interest because it was made just before the December 19, 1964 eclipse at a phase angle of $-2^{\circ}16'.1$.

Scan 37G (12°) — An excessive amount of structure in the rapid-scan direction is noted in the isotherms.

Scan 39G (26°) — There is evidence of misguiding indicated by the shape of the contours in the north.

Scan 41G (39°) — Code symbols and lines from the original paper show on the isophotes for this scan.

Scan 17D (49°) — Code symbols and lines show on the isophotes.

Scan 19D (63°) — The sun is just setting on Theophilus. It is interesting to note the great similarity between the isophotes and isotherms in this area near the terminator, which is not true near the subsolar point.

Scan 20D (77°) — An area northwest of Copernicus ($\xi = -0.42$, $\eta = +0.28$) shows cooler than its environs in this scan, as well as some others. It does not have a significantly higher albedo than its environs, being centered on a bay of Mare Imbrium just east of Tobias Mayer E. This may be a thermally anomalous area on the illuminated disk.

Scan 21D (90°) — This scan is made at third quarter with the sun just beyond the west limb.

Scan 29F (99°) — There are reading difficulties in the isophotes in the southern region because of the sharp brightness gradients. This is the last scan for which Tycho is illuminated; although it is an outstanding eclipse thermal anomaly, there is no indication of a higher temperature here near sunset. The minimum detectable noise temperature is the lowest of all the scans.

Scan 30F (112°) — The sun has now set on Tycho; its anomalous cooling shows up in this scan. Other small warm areas beyond the terminator may be hot spots associated with small craters. The sun is almost set on Copernicus.

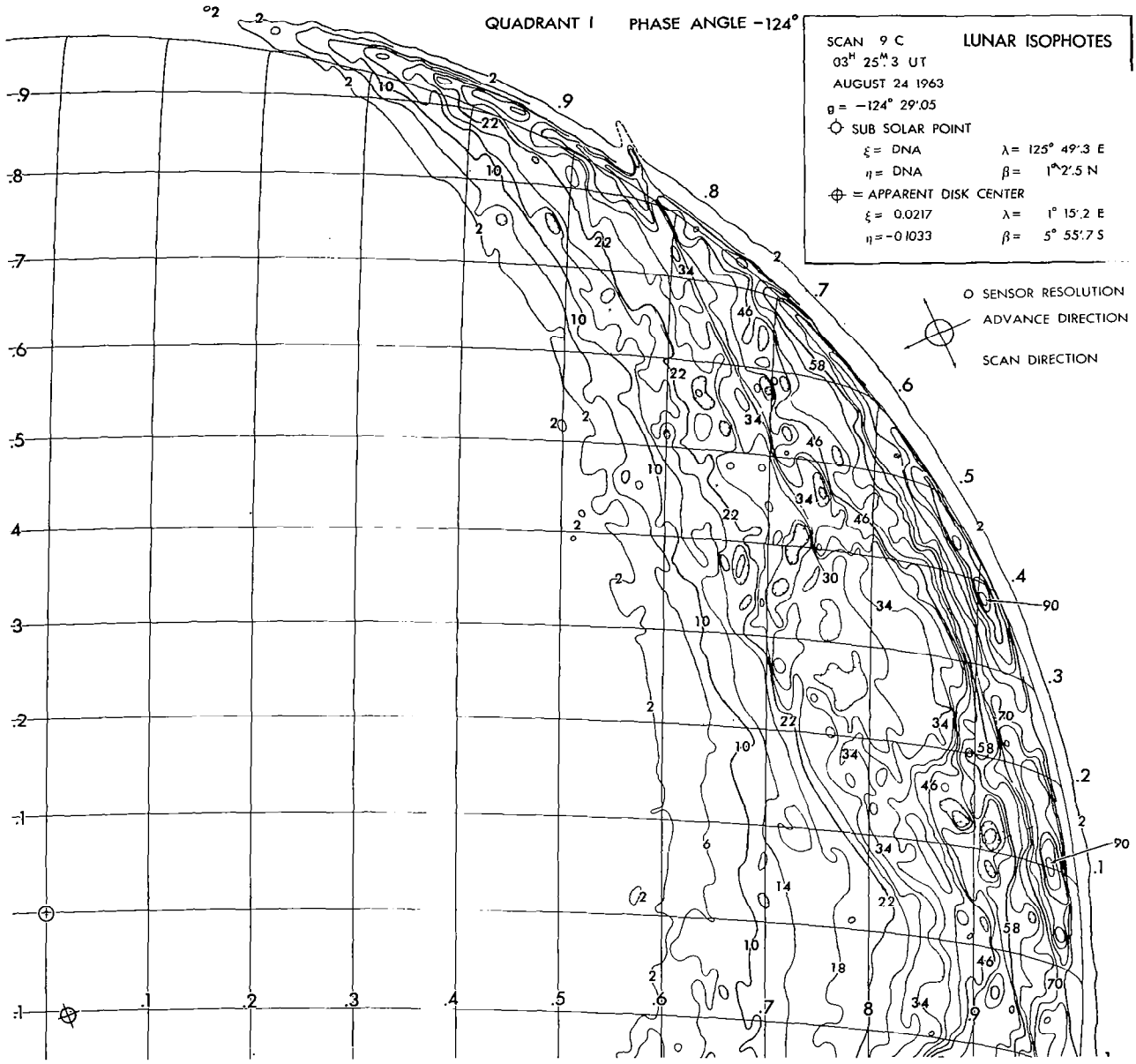
Scan 31F (124°) — Tycho still shows its anomalous cooling. There is a small warm area at $\xi = -0.34$, $\eta = +0.16$ which may be an indication of anomalous cooling on Copernicus.

Scan 32F (136°) — This scan was done at the largest phase angle. Tycho is still present in the isotherms. Apparently the grid fit suffers somewhat from the same problem mentioned for 9C; only eight points were used for the grid fit on this scan.

VII ATLAS CHARTS

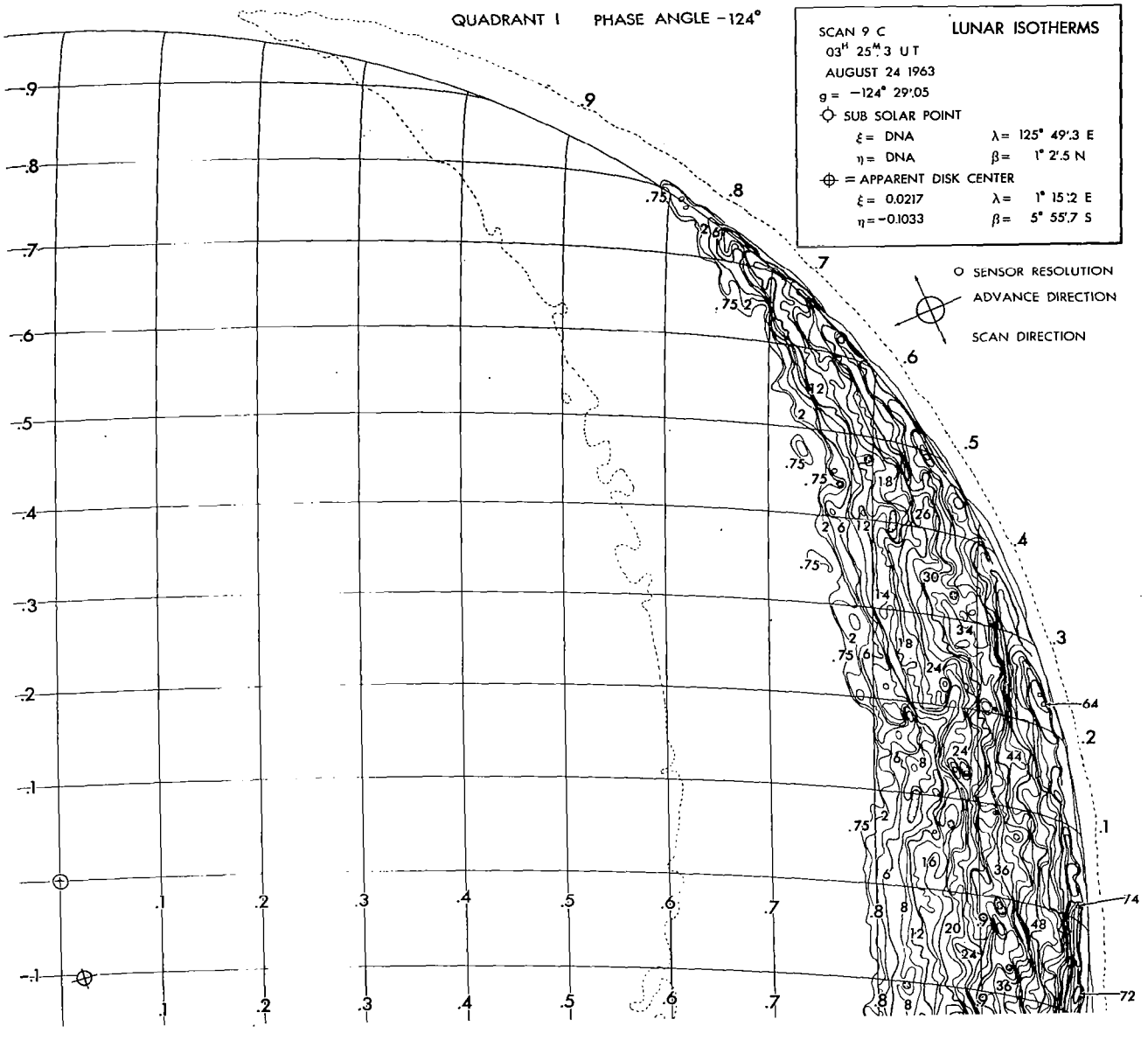
Scan No.	Phase Angle	Quadrants Illuminated	Page No.
9C	-125°	I,IV	40
12C	-114°	I,IV	44
14C	-102°	I,IV	48
15C	- 92°	I,IV	52
22E	- 89°	all	56
25E	- 65°	all	60
28E	- 40°	all	68
33G	- 29°	all	76
1H	- 18°	all	84
36G	- 15°	all**	92
34G	- 15°	all*	93
5H	- 4°	all	100
8H	- 2°	all	108
37G	12°	all	116
39G	26°	all	124
41G	40°	all	132
17D	49°	all	140
19D	63°	all	148
20D	77°	all	156
21D	90°	II,III	164
29F	99°	II,III	168
30F	112°	II,III	172
31F	124°	II,III	176
32F	136°	II,III	180

*Infrared only.
**Visible only.



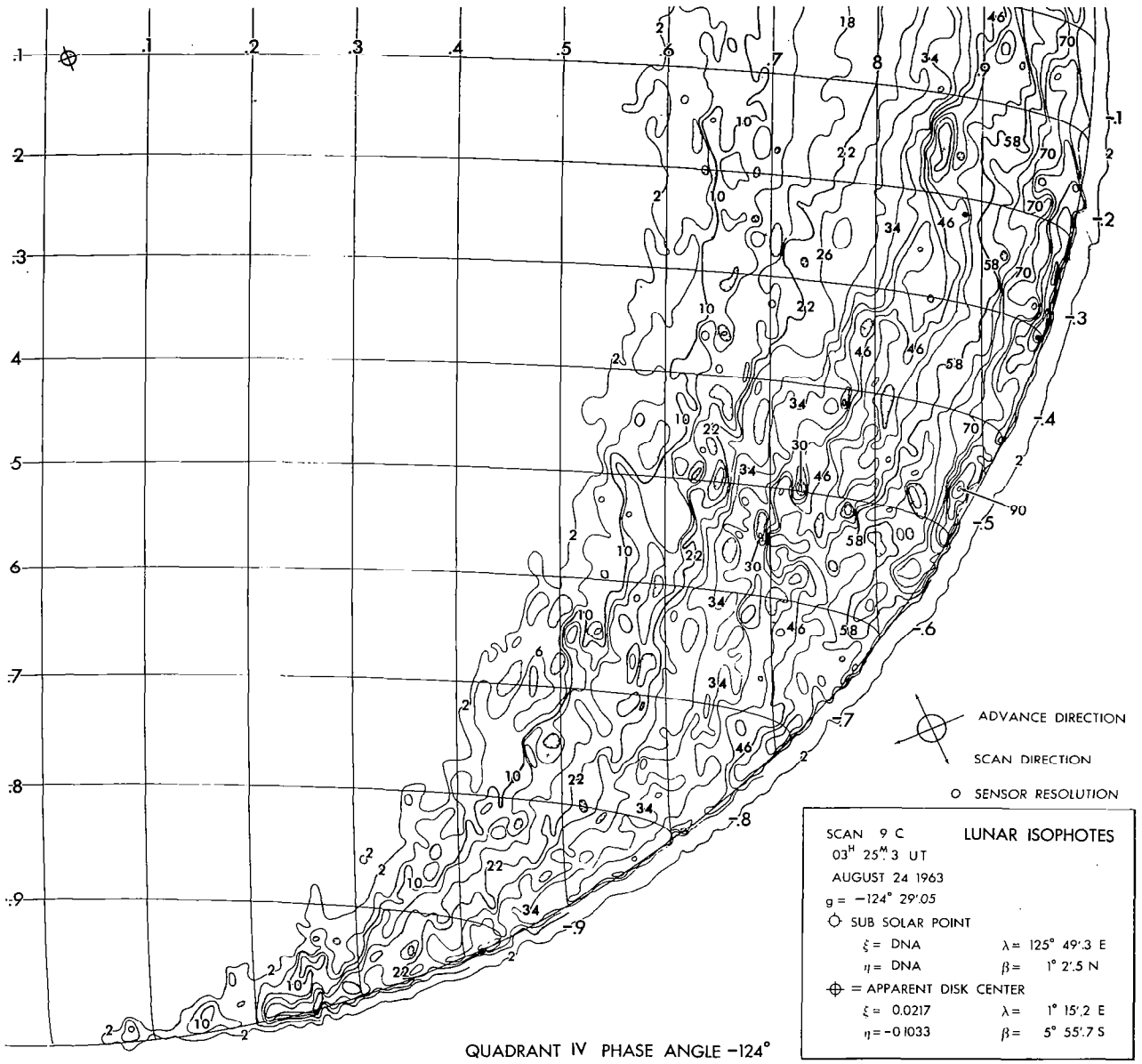
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.04	58	9.89
.75	.13	62	10.57
2	.34	66	11.25
6	1.02	70	11.94
10	1.71	74	12.62
14	2.39	78	13.30
18	3.07	82	13.98
22	3.75	86	14.66
26	4.43	90	15.35
30	5.12	94	16.03
34	5.80	98	16.71
38	6.48	102	17.39
42	7.16	106	18.07
46	7.84	110	18.76
50	8.53	114	19.44
54	9.21		



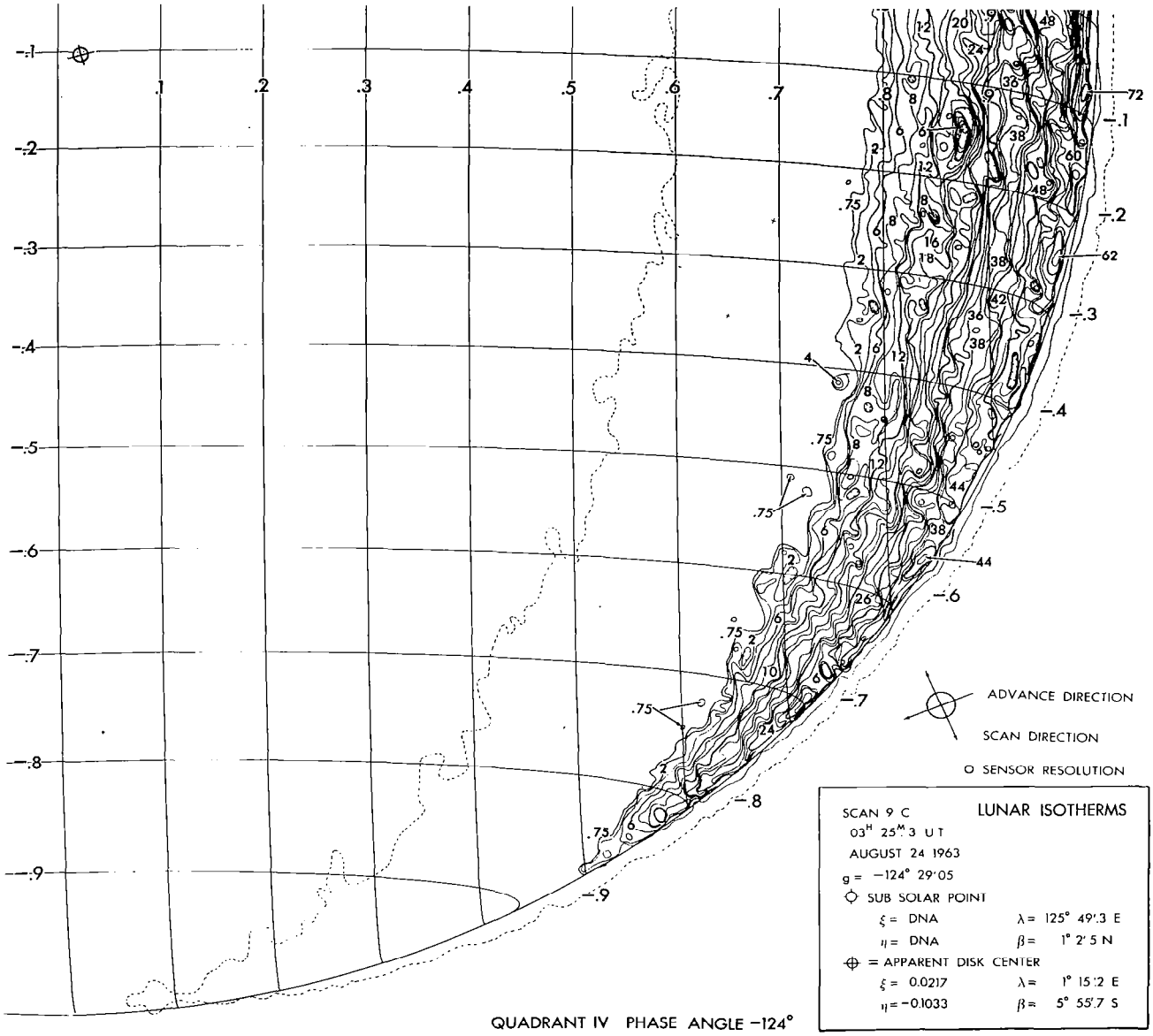
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K
18	283.0	50	308.2
20	284.7	52	309.6
22	286.4	54	311.0
24	288.1	56	312.4
26	289.8	58	313.8
28	291.5	60	315.1
30	293.1	62	316.5
32	294.7	64	317.8
34	296.3	66	319.1
36	297.8	68	320.4
38	299.3	70	321.7
40	300.9	72	323.0
42	302.4		
44	303.8		
46	305.3		
48	306.8		



BRIGHTNESS CALIBRATION DATA

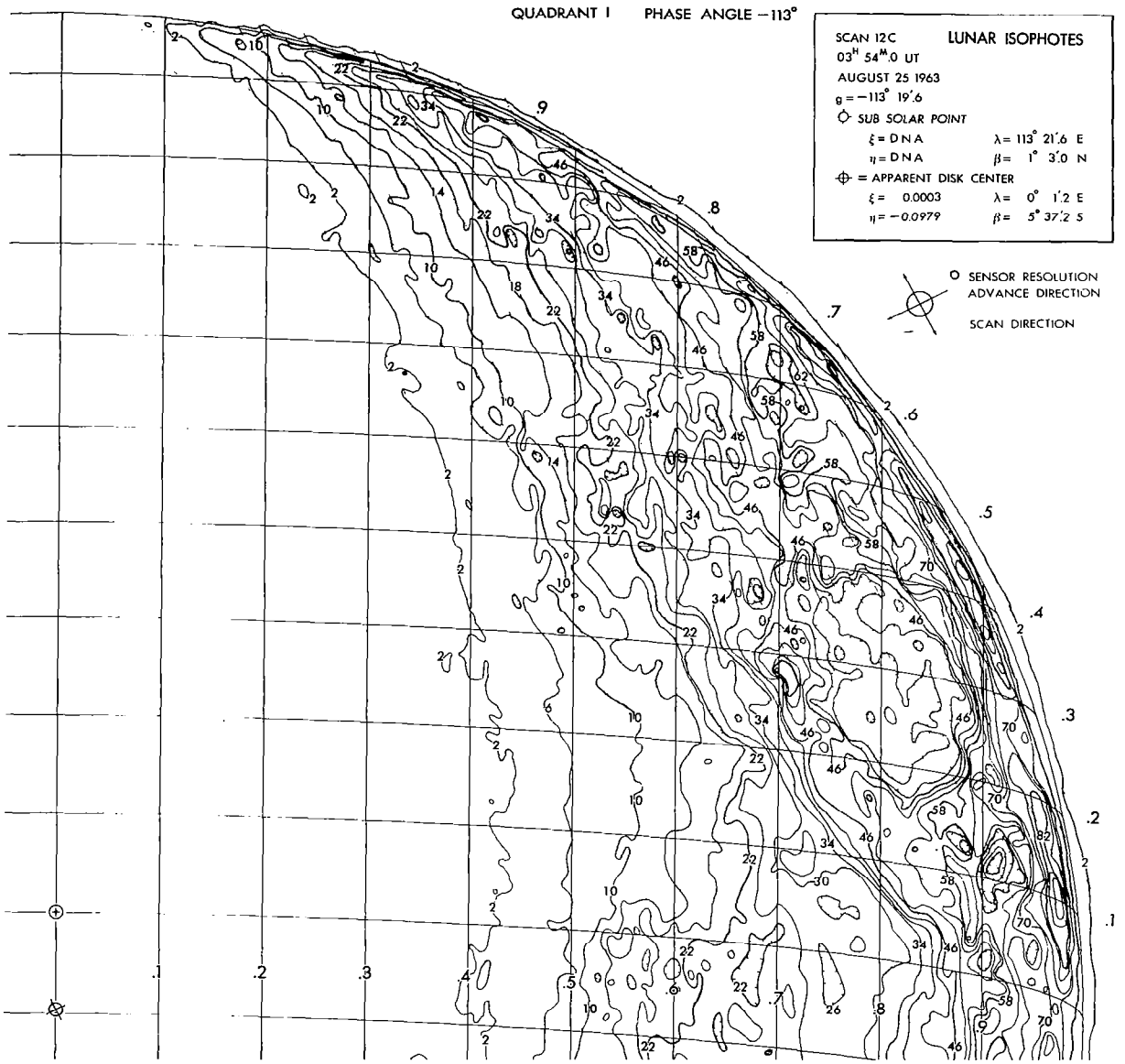
Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.04	58	9.89
.75	.13	62	10.57
2	.34	66	11.25
6	1.02	70	11.94
10	1.71	74	12.62
14	2.39	78	13.30
18	3.07	82	13.98
22	3.75	86	14.66
26	4.43	90	15.35
30	5.12	94	16.03
34	5.80	98	16.71
38	6.48	102	17.39
42	7.16	106	18.07
46	7.84	110	18.76
50	8.53	114	19.44
54	9.21		



QUADRANT IV PHASE ANGLE −124°

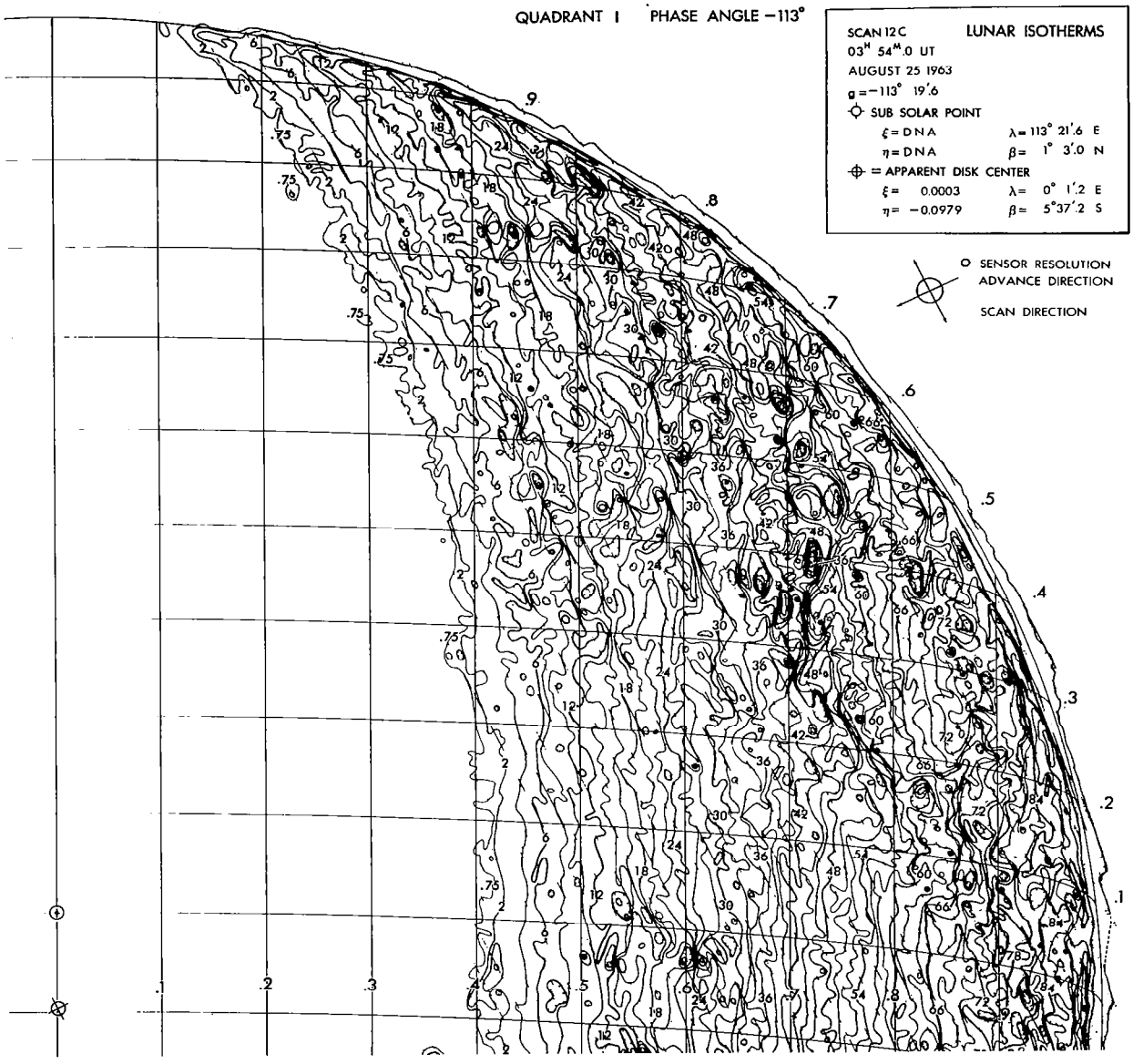
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K
18	283.0	50	308.2
20	284.7	52	309.6
22	286.4	54	311.0
24	288.1	56	312.4
26	289.8	58	313.8
28	291.5	60	315.1
30	293.1	62	316.5
32	294.7	64	317.8
34	296.3	66	319.1
36	297.8	68	320.4
38	299.3	70	321.7
40	300.9	72	323.0
42	302.4		
44	303.8		
46	305.3		
48	306.8		



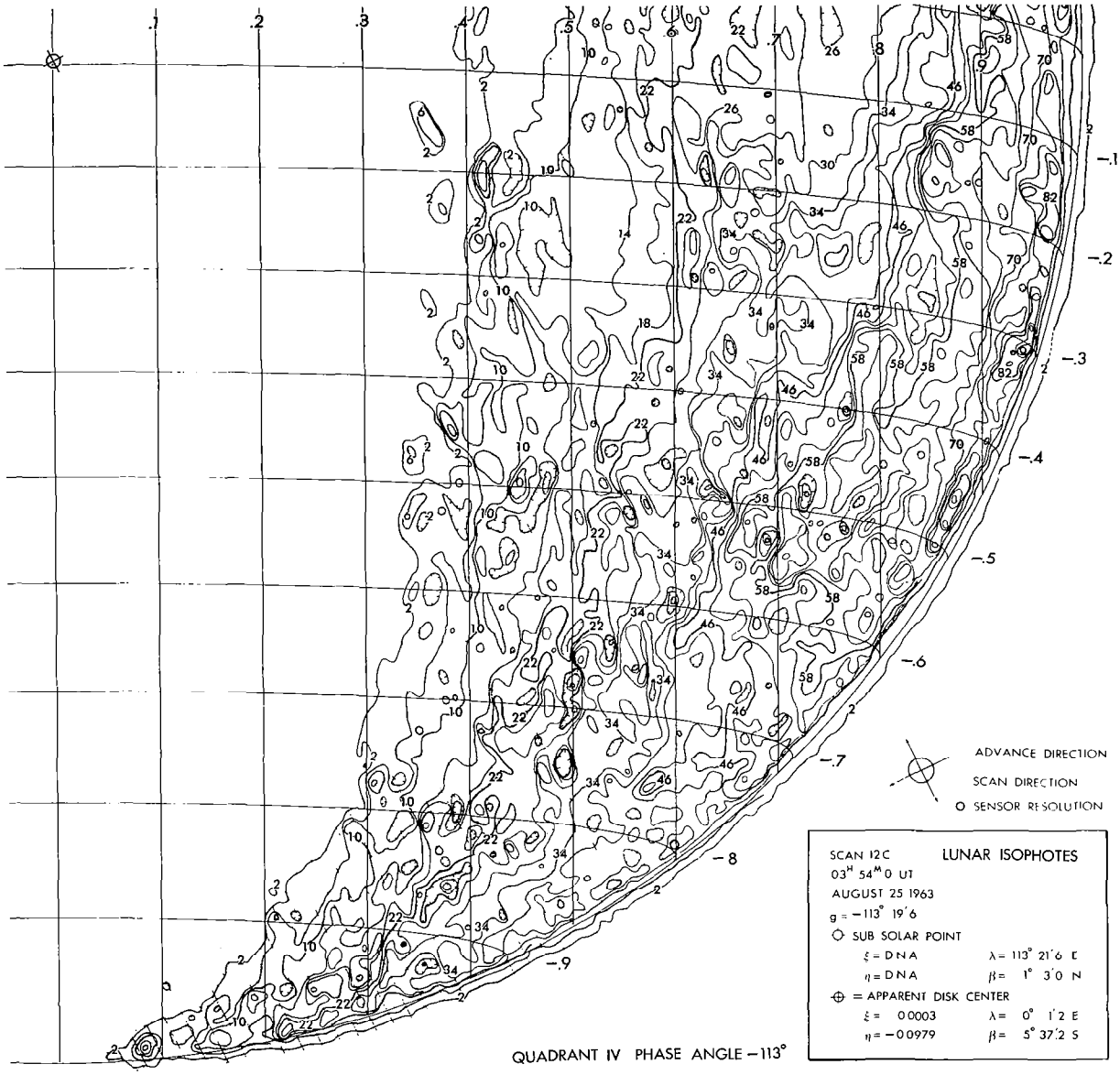
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.05	58	11.27
.75	.15	62	12.04
2	.39	66	12.82
6	1.17	70	13.60
10	1.94	74	14.37
14	2.72	78	15.15
18	3.50	82	15.93
22	4.27	86	16.71
26	5.05	90	17.48
30	5.83	94	18.26
34	6.60	98	19.04
38	7.38	102	19.81
42	8.16	106	20.59
46	8.94	110	21.37
50	9.71	114	22.14
54	10.49		



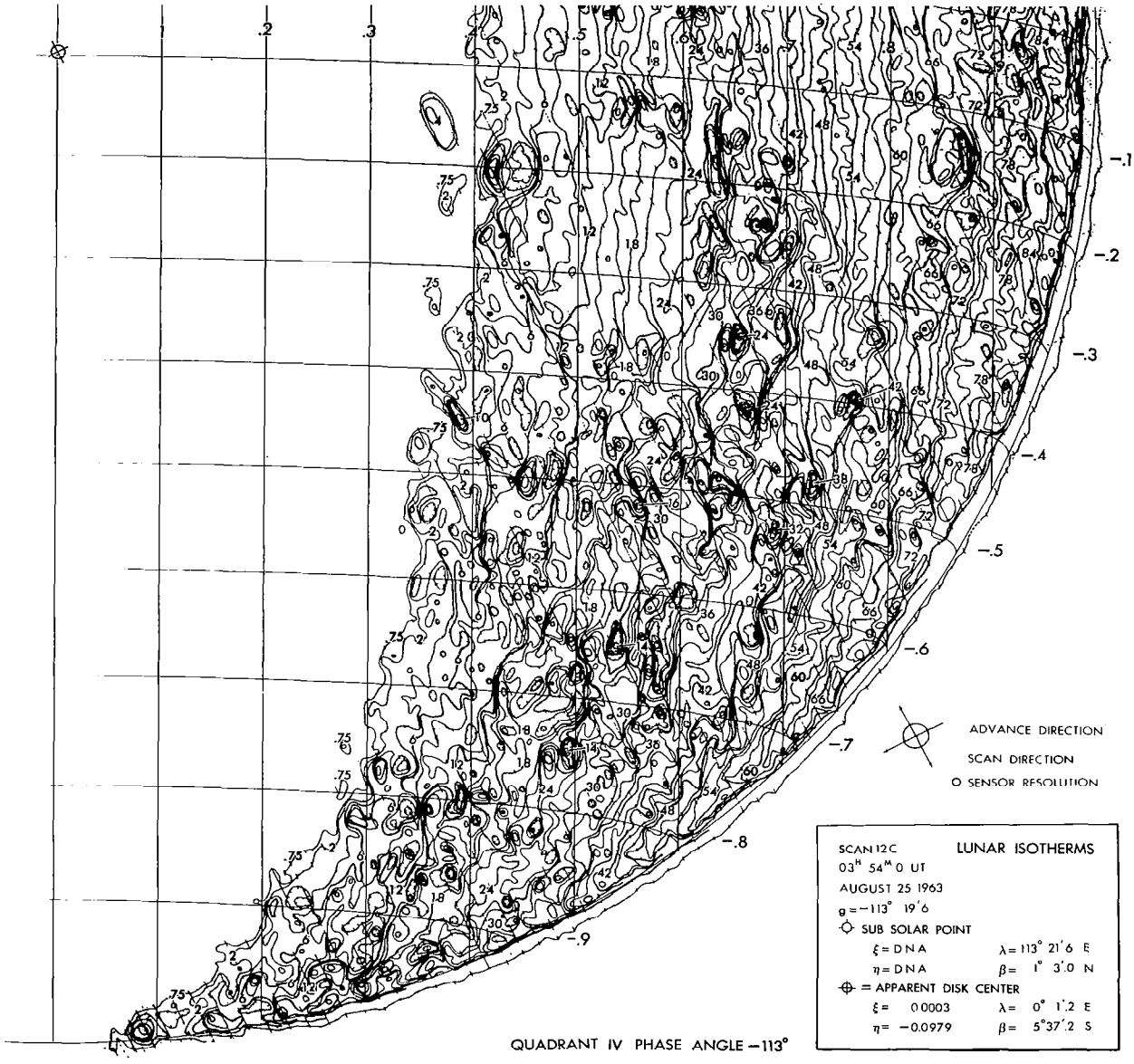
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.7	32	277.2	64	324.2	96	359.5
2	174.9	34	280.8	66	326.6	98	361.5
4	192.7	36	284.3	68	329.1		
6	204.9	38	287.6	70	331.4		
8	214.6	40	290.8	72	333.8		
10	222.7	42	294.0	74	336.1		
12	229.8	44	297.1	76	338.3		
14	236.2	46	300.0	78	340.6		
16	242.0	48	303.0	80	342.8		
18	247.3	50	305.8	82	345.0		
20	252.3	52	308.6	84	347.1		
22	257.0	54	311.3	86	349.2		
24	261.4	56	314.0	88	351.3		
26	265.6	58	316.6	90	353.4		
28	269.7	60	319.2	92	355.5		
30	273.5	62	321.8	94	357.5		



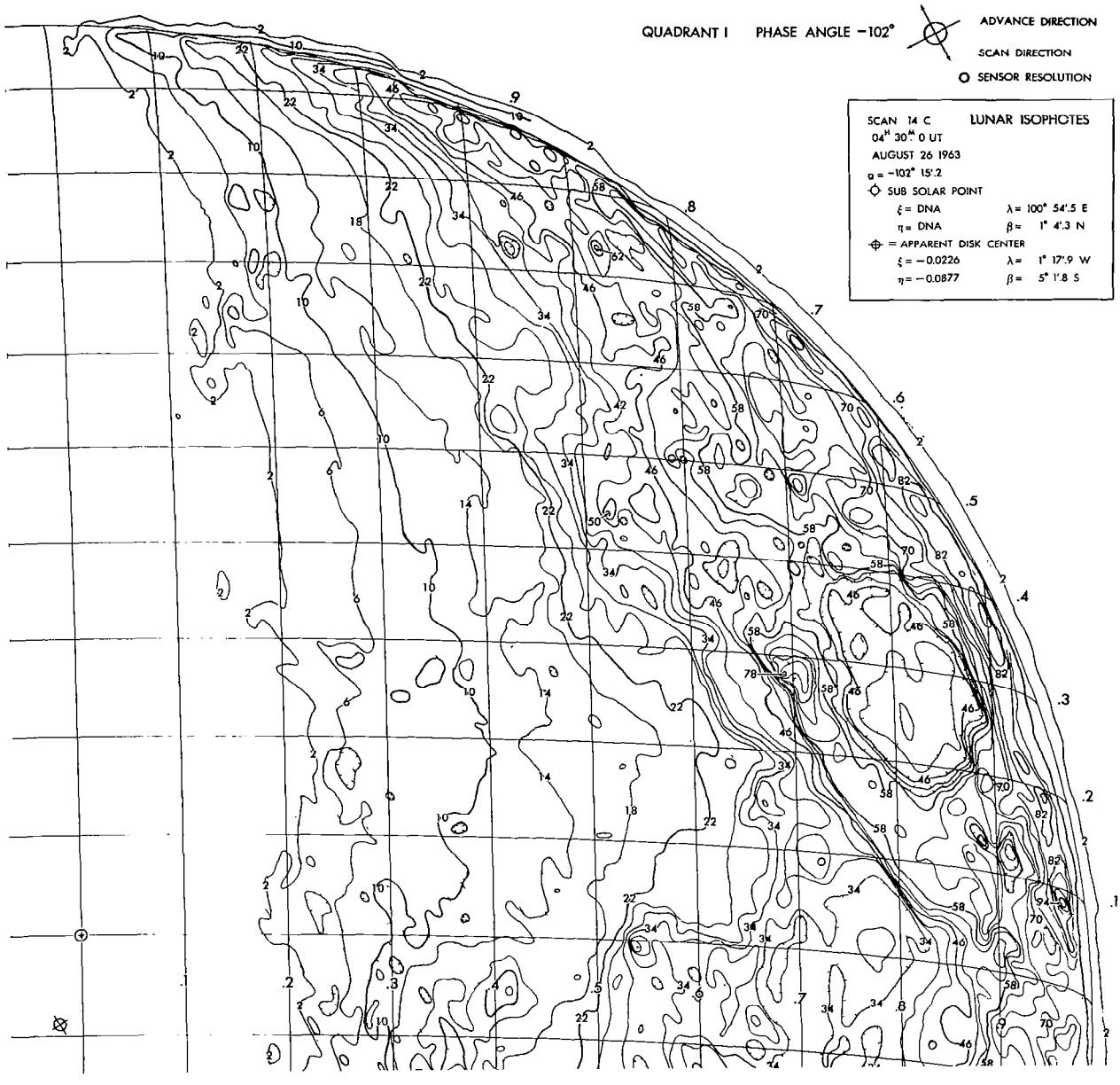
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.05	58	11.27
.75	.15	62	12.04
2	.39	66	12.82
6	1.17	70	13.60
10	1.94	74	14.37
14	2.72	78	15.15
18	3.50	82	15.93
22	4.27	86	16.71
26	5.05	90	17.48
30	5.83	94	18.26
34	6.60	98	19.04
38	7.38	102	19.81
42	8.16	106	20.59
46	8.94	110	21.37
50	9.71	114	22.14
54	10.49		



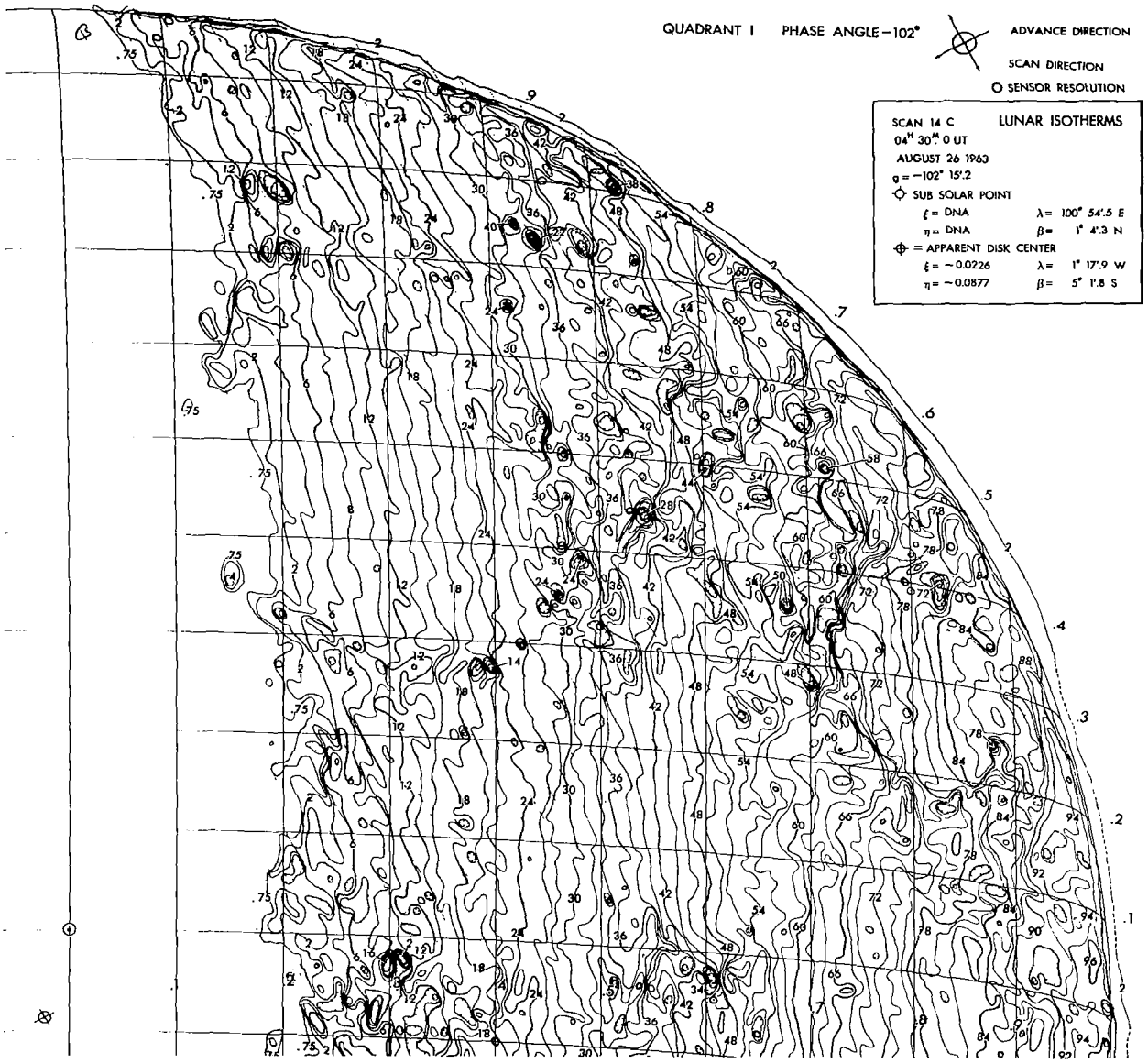
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.7	32	277.2	64	324.2	96	359.5
2	174.9	34	280.8	66	326.6	98	361.5
4	192.7	36	284.3	68	329.1		
6	204.9	38	287.6	70	331.4		
8	214.6	40	290.8	72	333.8		
10	222.7	42	294.0	74	336.1		
12	229.8	44	297.1	76	338.3		
14	236.2	46	300.0	78	340.6		
16	242.0	48	303.0	80	342.8		
18	247.3	50	305.8	82	345.0		
20	252.3	52	308.6	84	347.1		
22	257.0	54	311.3	86	349.2		
24	261.4	56	314.0	88	351.3		
26	265.6	58	316.6	90	353.4		
28	269.7	60	319.2	92	355.5		
30	273.5	62	321.8	94	357.5		



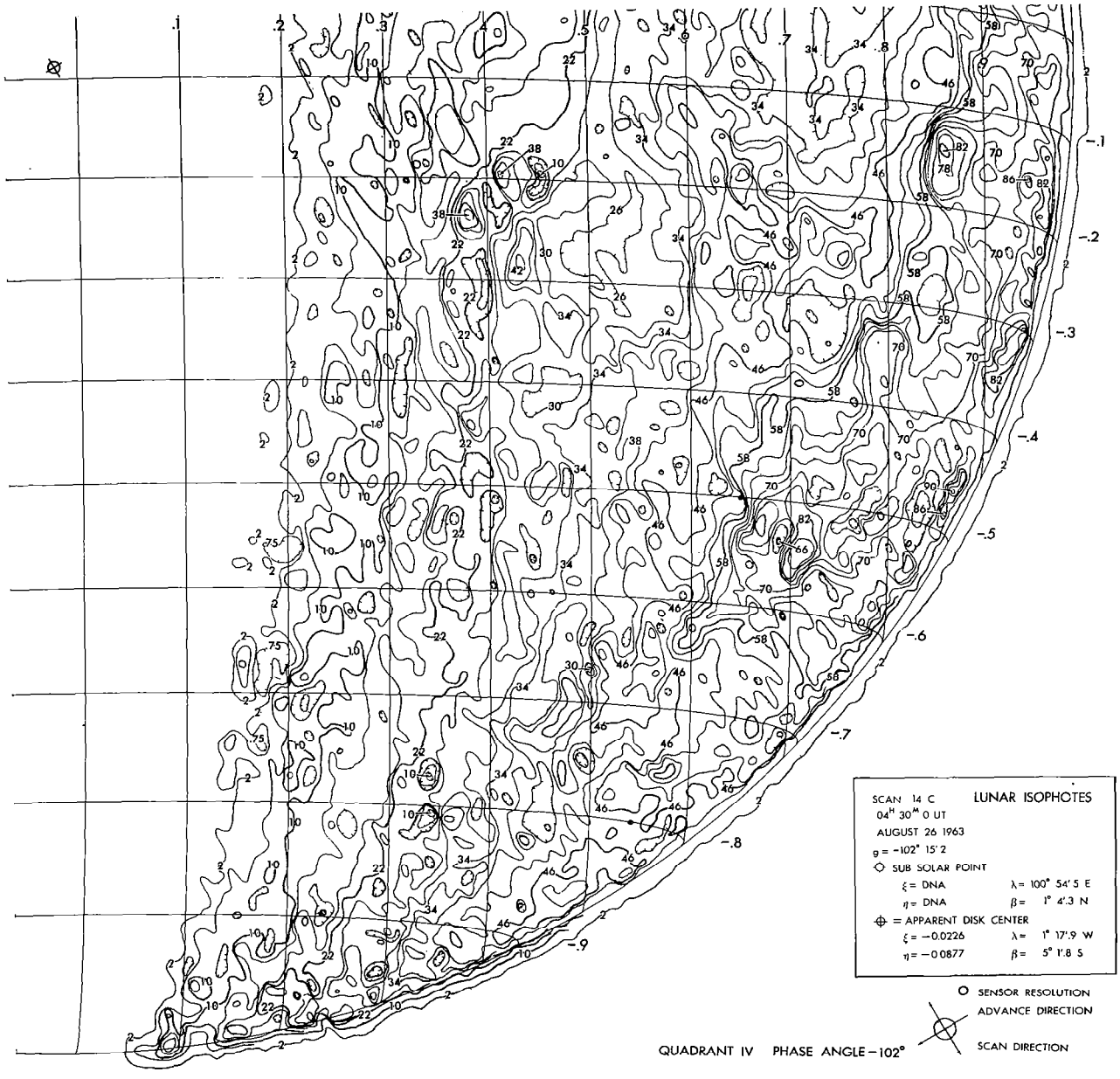
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.05	58	12.74
.75	.17	62	13.62
2	.44	66	14.50
6	1.32	70	15.37
10	2.20	74	16.25
14	3.07	78	17.13
18	3.95	82	18.01
22	4.83	86	18.89
26	5.71	90	19.77
30	6.59	94	20.64
34	7.47	98	21.52
38	8.35	102	22.40
42	9.22	106	23.28
46	10.10	110	24.16
50	10.98	114	25.04
54	11.86		



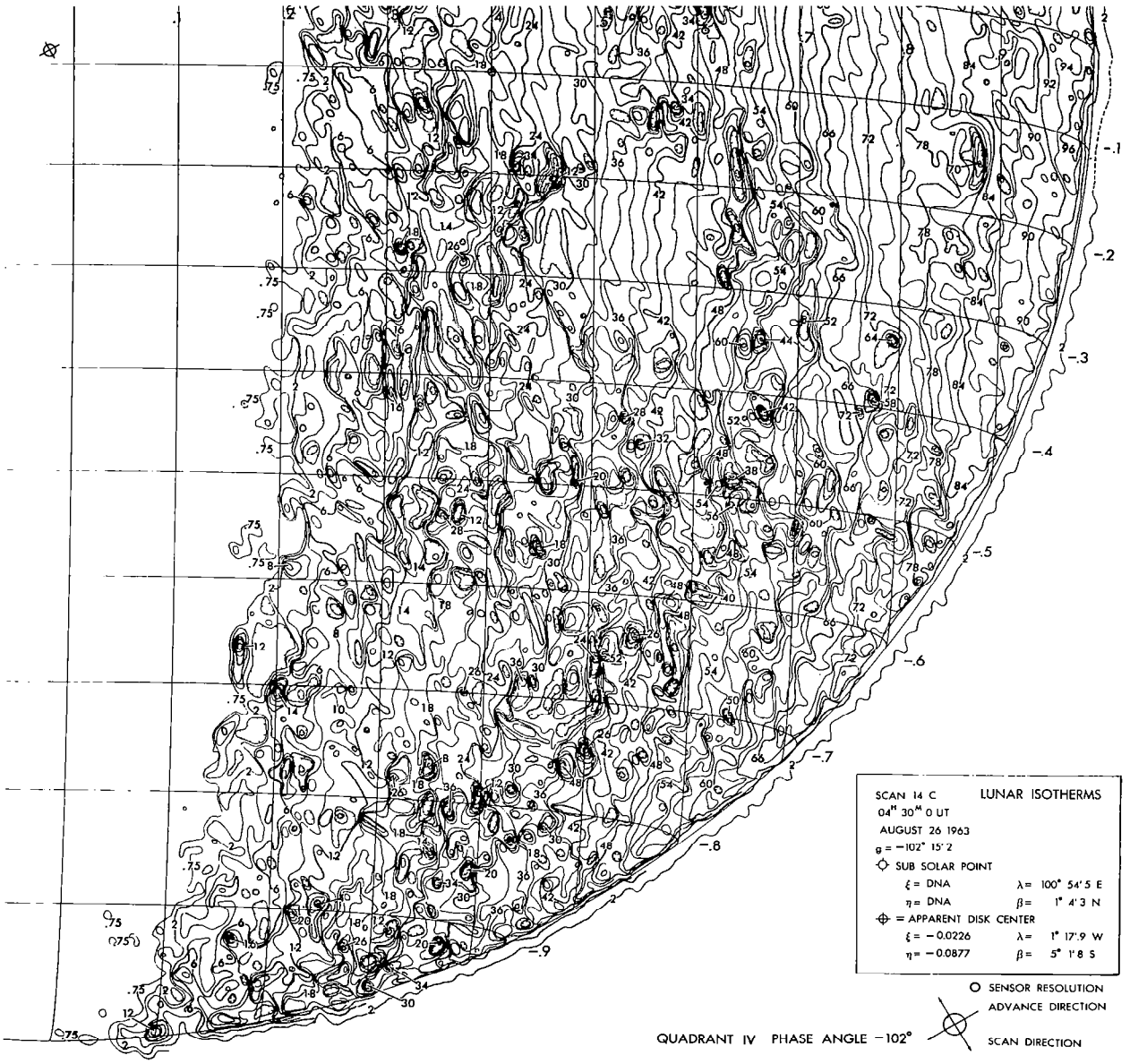
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.0	32	275.0	64	321.2	96	355.8
2	174.0	34	278.5	66	323.6	98	357.8
4	191.6	36	281.9	68	325.9	100	359.7
6	203.7	38	285.2	70	328.3		
8	213.2	40	288.4	72	330.6		
10	221.2	42	291.5	74	333.8		
12	228.3	44	294.5	76	335.0		
14	234.5	46	297.4	78	337.2		
16	240.3	48	300.3	80	339.4		
18	245.5	50	303.1	82	341.5		
20	250.5	52	305.8	84	343.7		
22	255.1	54	308.5	86	345.7		
24	259.4	56	311.2	88	347.8		
26	263.6	58	313.7	90	349.8		
28	267.6	60	316.3	92	351.9		
30	271.4	62	318.7	94	353.8		



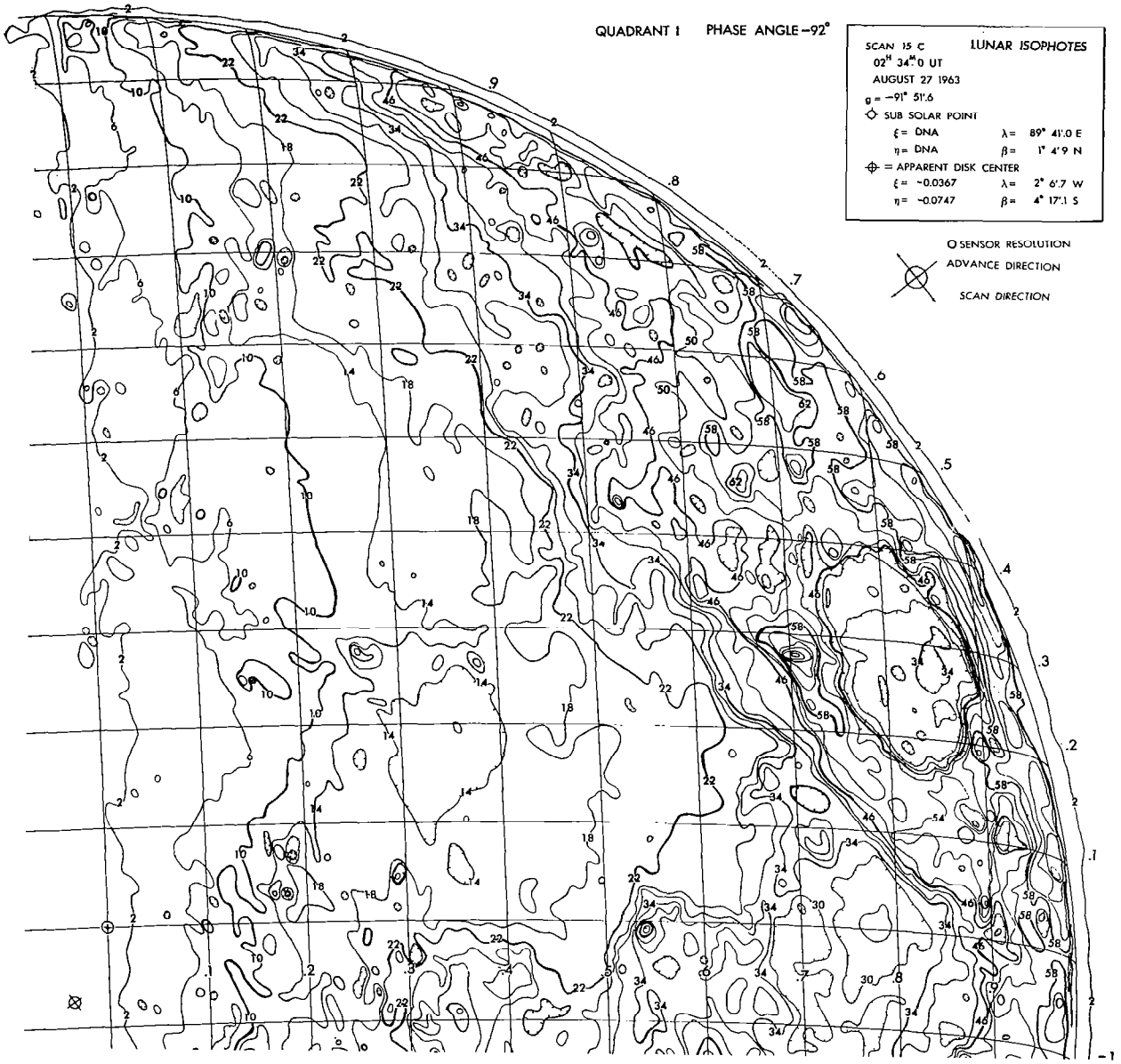
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.05	58	12.74
.75	.17	62	13.62
2	.44	66	14.50
6	1.32	70	15.37
10	2.20	74	16.25
14	3.07	78	17.13
18	3.95	82	18.01
22	4.83	86	18.89
26	5.71	90	19.77
30	6.59	94	20.64
34	7.47	98	21.52
38	8.35	102	22.40
42	9.22	106	23.28
46	10.10	110	24.16
50	10.98	114	25.04
54	11.86		



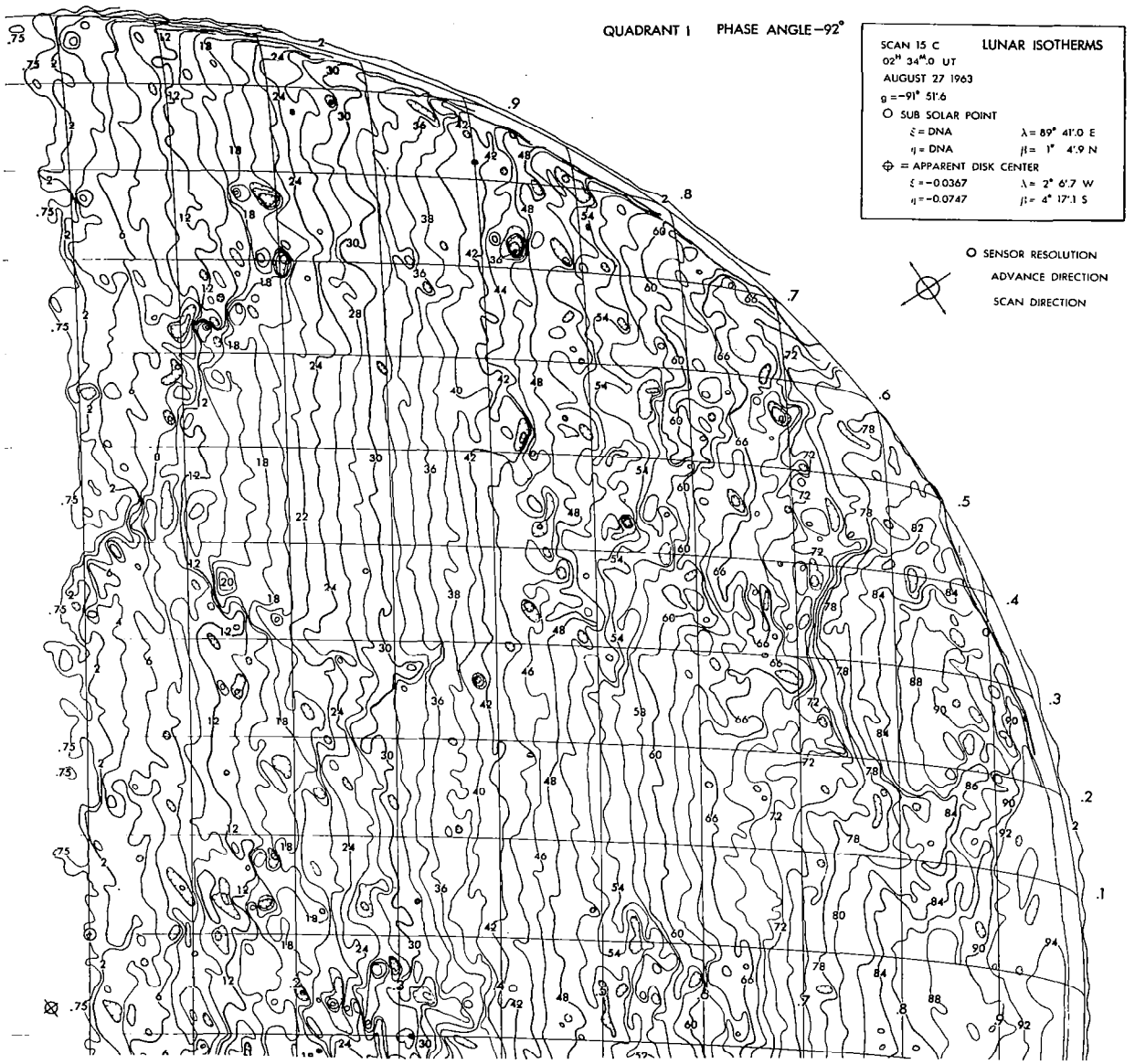
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.0	32	275.0	64	321.2	96	355.8
2	174.0	34	278.5	66	323.6	98	357.8
4	191.6	36	281.9	68	325.9	100	359.7
6	203.7	38	285.2	70	328.3		
8	213.2	40	288.4	72	330.6		
10	221.2	42	291.5	74	333.8		
12	228.3	44	294.5	76	335.0		
14	234.5	46	297.4	78	337.2		
16	240.3	48	300.3	80	339.4		
18	245.5	50	303.1	82	341.5		
20	250.5	52	305.8	84	343.7		
22	255.1	54	308.5	86	345.7		
24	259.4	56	311.2	88	347.8		
26	263.6	58	313.7	90	349.8		
28	267.6	60	316.3	92	351.9		
30	271.4	62	318.7	94	353.8		



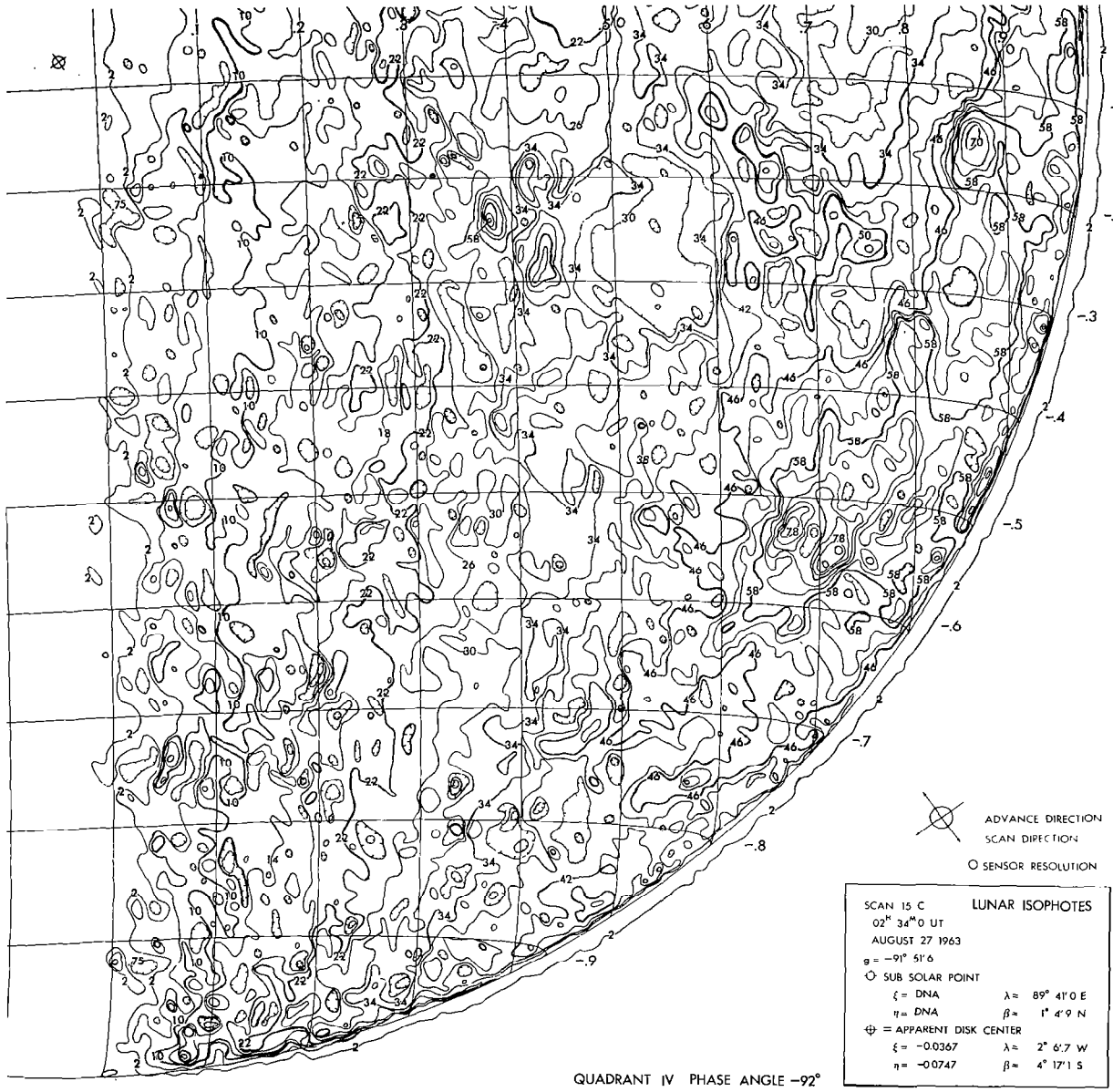
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.08	58	17.94
.75	.23	62	19.18
2	.62	66	20.42
6	1.86	70	21.66
10	3.09	74	22.89
14	4.33	78	24.13
18	5.57	82	25.37
22	6.81	86	26.61
26	8.04	90	27.84
30	9.28	94	29.08
34	10.52	98	30.32
38	11.76	102	31.56
42	12.99		
46	14.23		
50	15.47		
54	16.71		



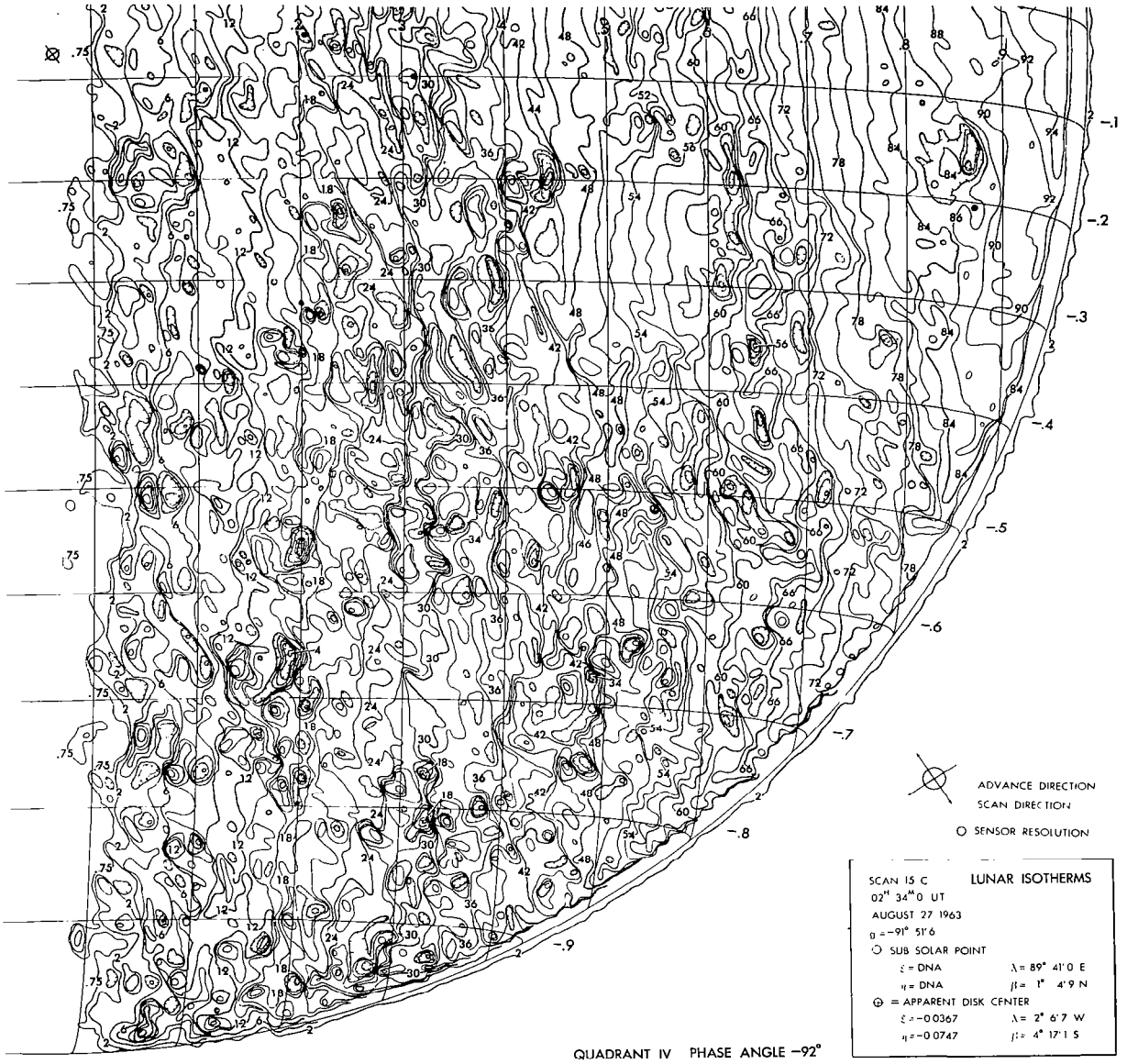
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	157.0	32	284.6	64	334.1	96	371.5
2	177.9	34	288.3	66	336.6		
4	196.4	36	291.9	68	339.2		
6	209.0	38	295.4	70	341.7		
8	219.0	40	298.9	72	344.2		
10	227.5	42	302.2	74	346.6		
12	234.9	44	305.4	76	349.0		
14	241.5	46	308.5	78	351.4		
16	247.6	48	311.6	80	353.7		
18	253.2	50	314.6	82	356.0		
20	258.4	52	317.6	84	358.3		
22	263.3	54	320.4	86	360.6		
24	268.0	56	323.3	88	362.8		
26	272.4	58	326.0	90	365.0		
28	276.6	60	328.8	92	367.2		
30	280.7	62	331.4	94	369.3		



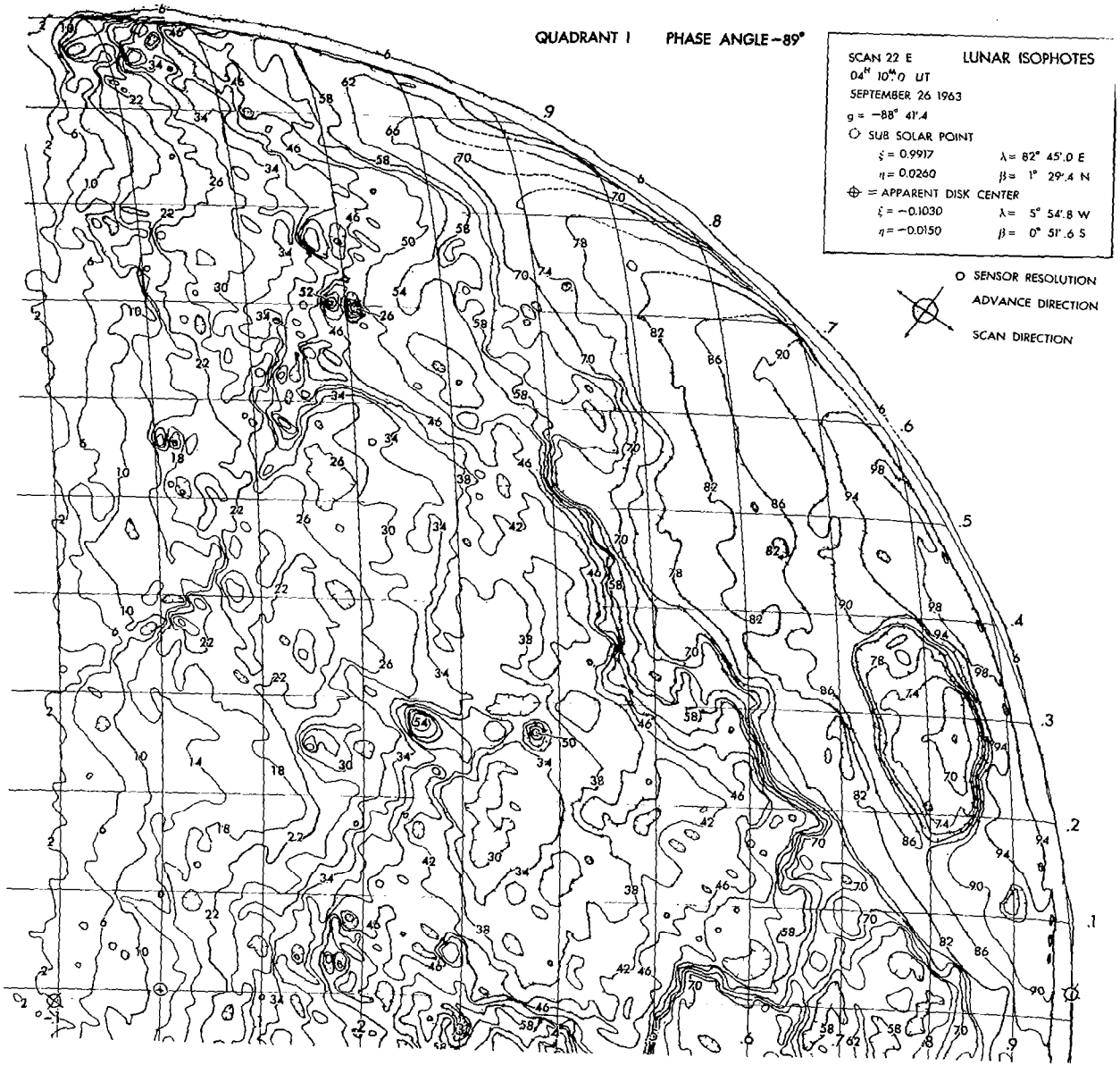
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.08	58	17.94
.75	.23	62	19.18
2	.62	66	20.42
6	1.86	70	21.66
10	3.09	74	22.89
14	4.33	78	24.13
18	5.57	82	25.37
22	6.81	86	26.61
26	8.04	90	27.84
30	9.28	94	29.08
34	10.52	98	30.32
38	11.76	102	31.56
42	12.99		
46	14.23		
50	15.47		
54	16.71		



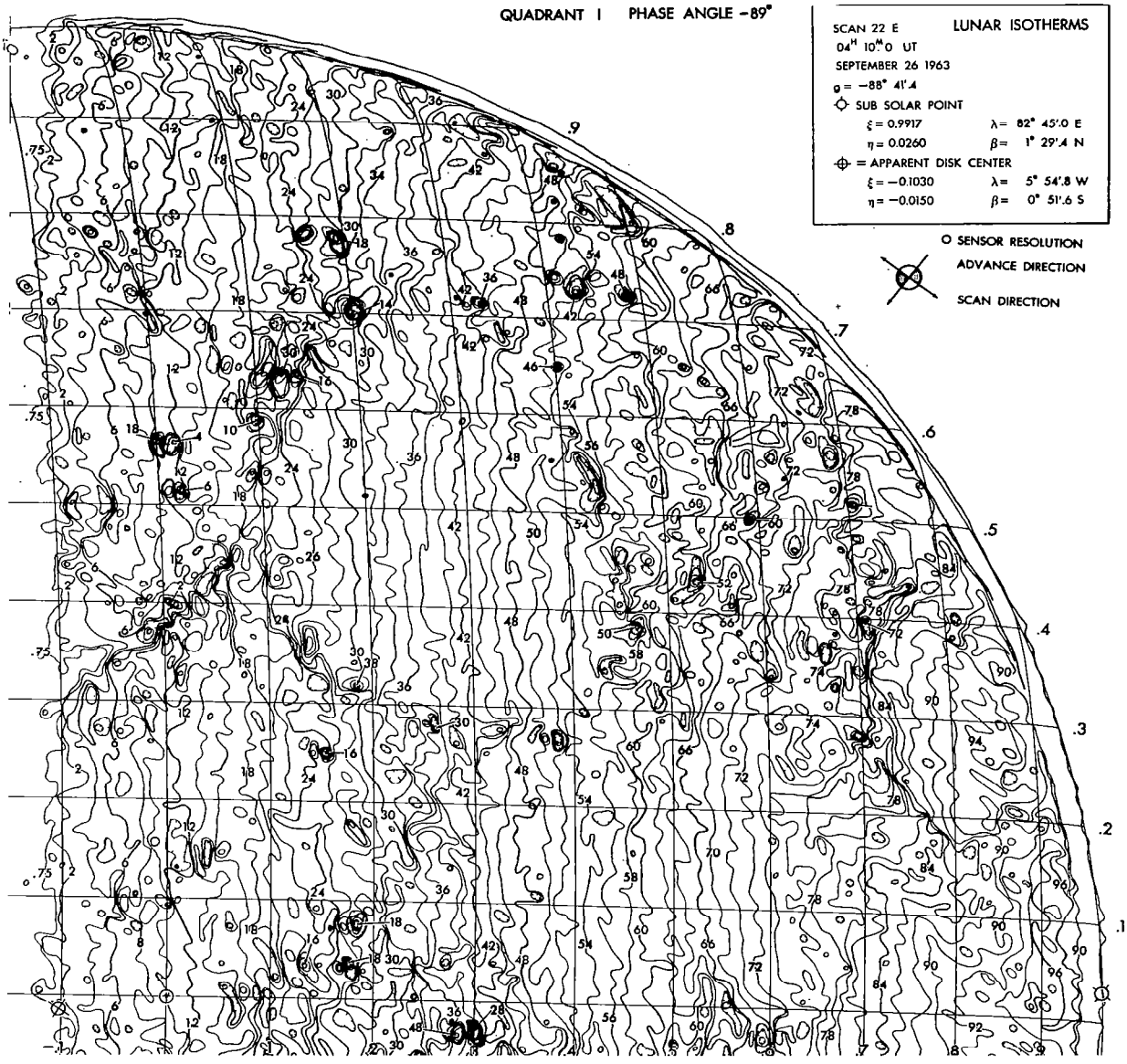
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	157.0	32	284.6	64	334.1	96	371.5
2	177.9	34	288.3	66	336.6		
4	196.4	36	291.9	68	339.2		
6	209.0	38	295.4	70	341.7		
8	219.0	40	298.9	72	344.2		
10	227.5	42	302.2	74	346.6		
12	234.9	44	305.4	76	349.0		
14	241.5	46	308.5	78	351.4		
16	247.6	48	311.6	80	353.7		
18	253.2	50	314.6	82	356.0		
20	258.4	52	317.6	84	358.3		
22	263.3	54	320.4	86	360.6		
24	268.0	56	323.3	88	362.8		
26	272.4	58	326.0	90	365.0		
28	276.6	60	328.8	92	367.2		
30	280.7	62	331.4	94	369.3		



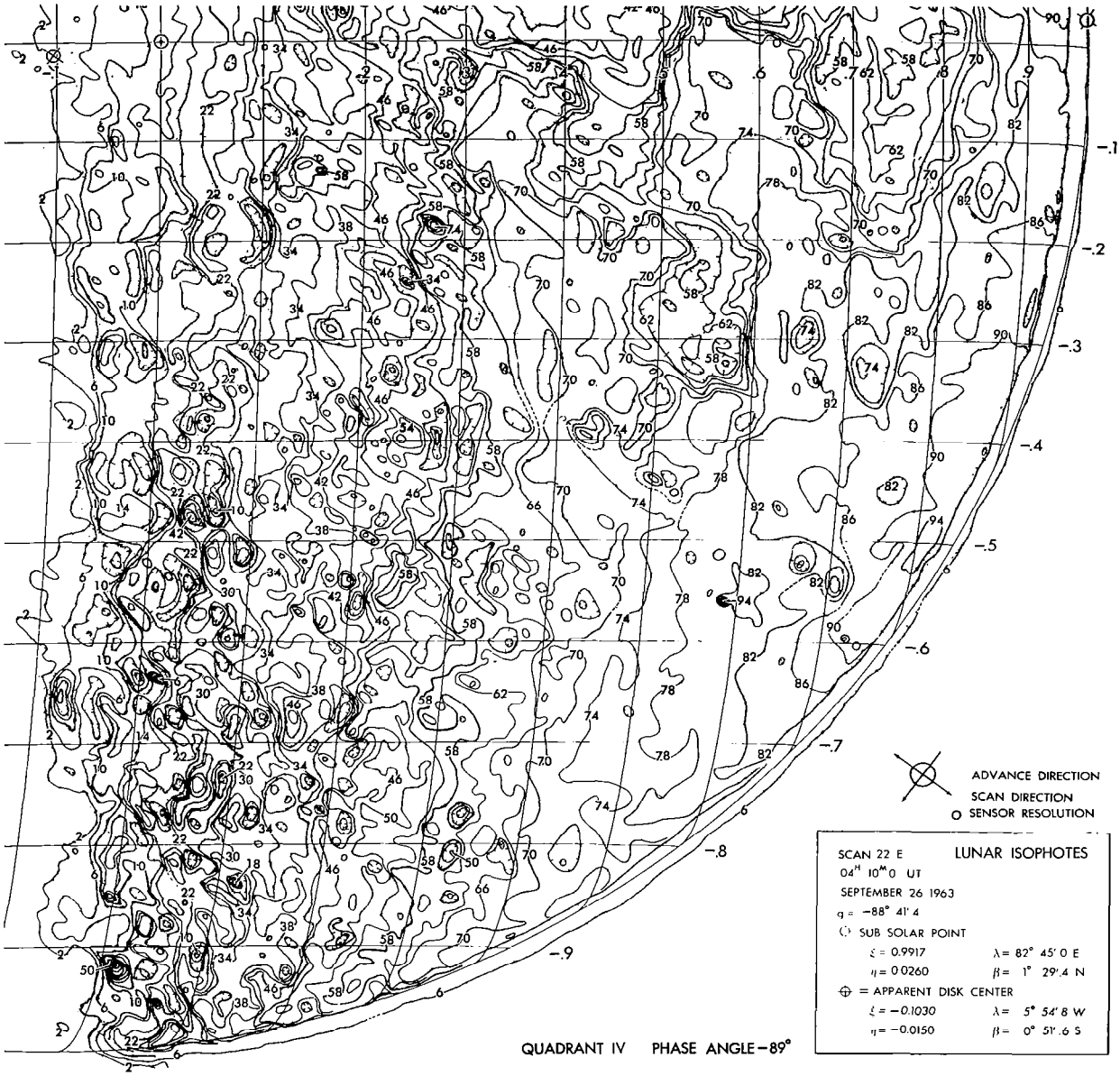
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.04	58	10.03	122	21.10
.75	.13	62	10.72		
2	.35	66	11.42		
6	1.04	70	12.11		
10	1.73	74	12.80		
14	2.42	78	13.49		
18	3.11	82	14.18		
22	3.81	86	14.88		
26	4.50	90	15.57		
30	5.19	94	16.26		
34	5.88	98	16.95		
38	6.57	102	17.64		
42	7.27	106	18.34		
46	7.96	110	19.03		
50	8.65	114	19.72		
54	9.34	118	20.41		



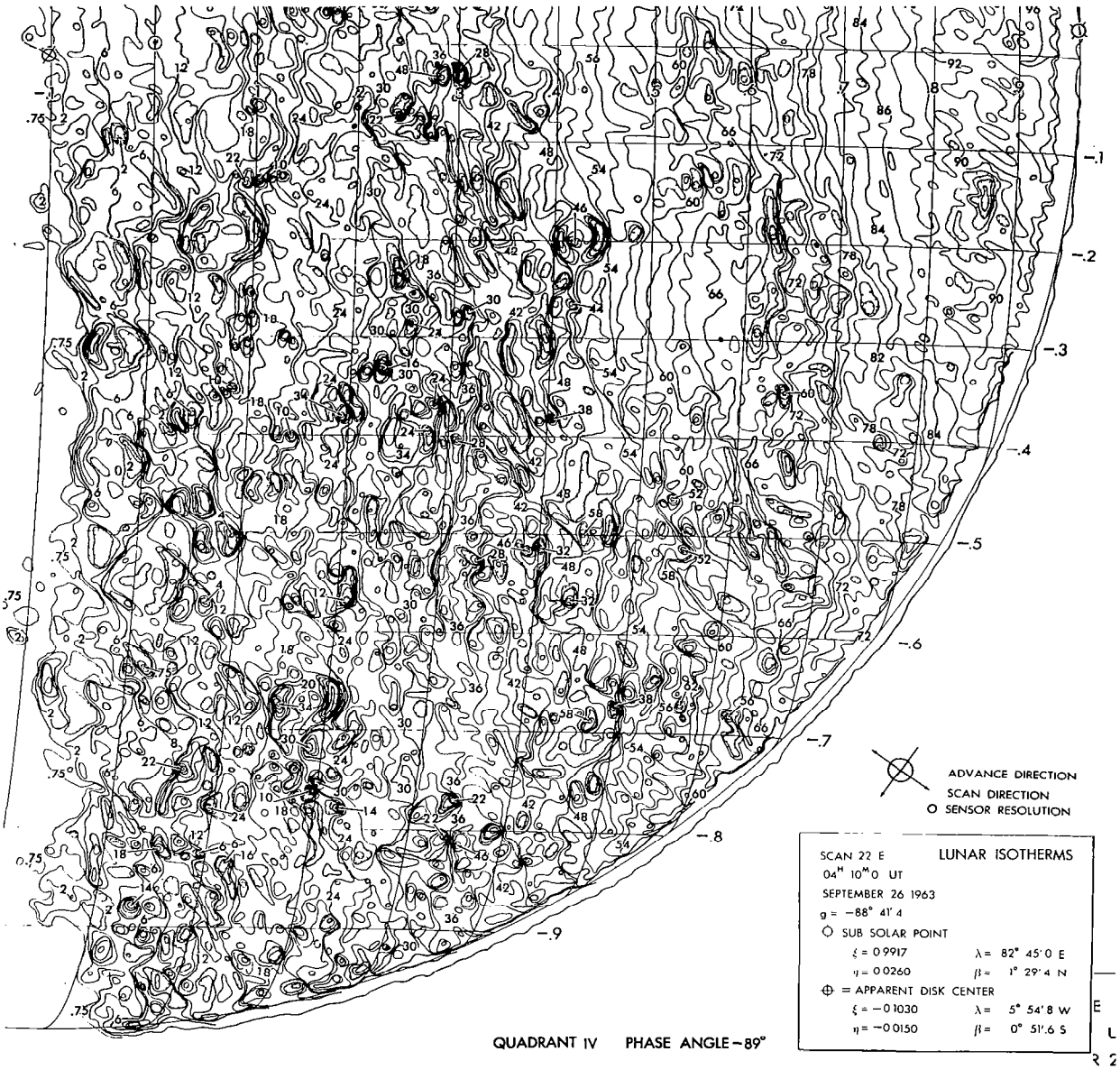
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.7	32	277.3	64	324.3	96	359.6
2	175.0	34	280.9	66	326.7	98	361.6
4	192.8	36	284.3	68	329.1	100	363.6
6	205.0	38	287.7	70	331.5		
8	214.6	40	290.9	72	333.8		
10	222.8	42	294.1	74	336.1		
12	229.9	44	297.1	76	338.4		
14	236.2	46	300.1	78	340.6		
16	242.0	48	303.0	80	342.9		
18	247.4	50	305.9	82	345.0		
20	252.4	52	308.7	84	347.2		
22	257.1	54	311.4	86	349.3		
24	261.5	56	314.1	88	351.4		
26	265.7	58	316.7	90	353.5		
28	269.8	60	319.3	92	355.5		
30	273.6	62	321.8	94	357.6		



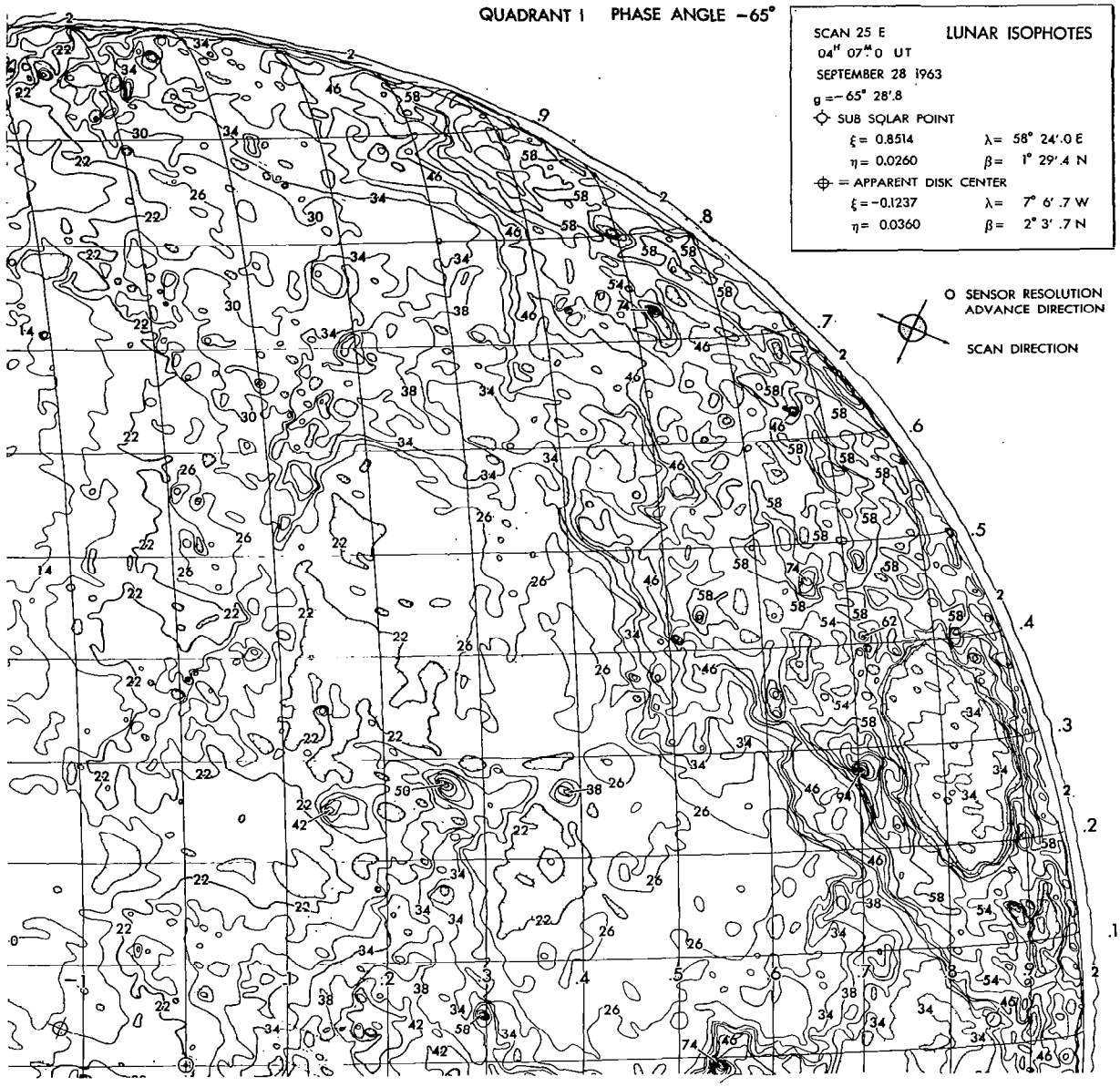
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.04	58	10.03	122	21.10
.75	.13	62	10.72		
2	.35	66	11.42		
6	1.04	70	12.11		
10	1.73	74	12.80		
14	2.42	78	13.49		
18	3.11	82	14.18		
22	3.81	86	14.88		
26	4.50	90	15.57		
30	5.19	94	16.26		
34	5.88	98	16.95		
38	6.57	102	17.64		
42	7.27	106	18.34		
46	7.96	110	19.03		
50	8.65	114	19.72		
54	9.34	118	20.41		



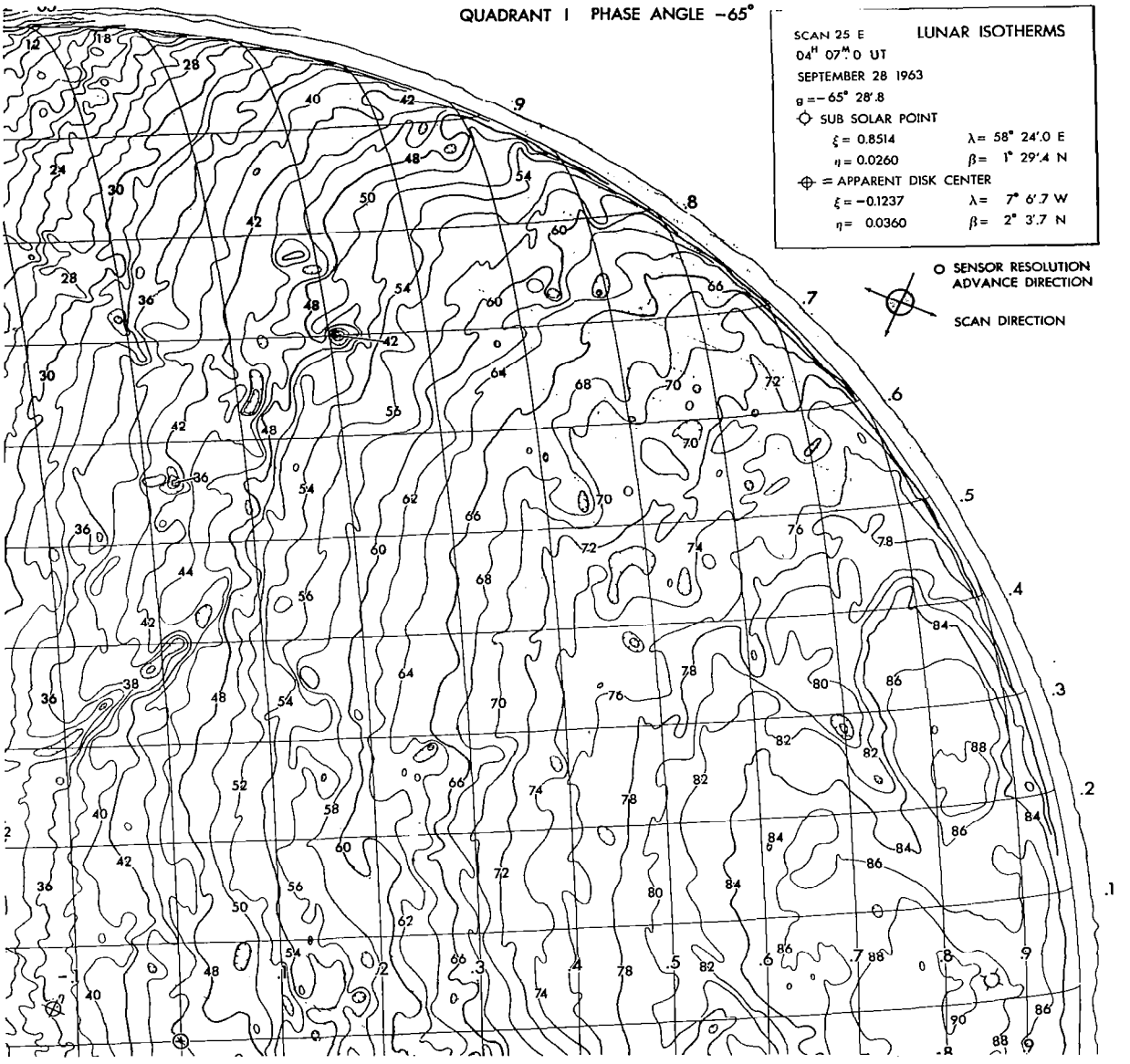
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.7	32	277.3	64	324.3	96	359.6
2	175.0	34	280.9	66	326.7	98	361.6
4	192.8	36	284.3	68	329.1	100	363.6
6	205.0	38	287.7	70	331.5		
8	214.6	40	290.9	72	333.8		
10	222.8	42	294.1	74	336.1		
12	229.9	44	297.1	76	338.4		
14	236.2	46	300.1	78	340.6		
16	242.0	48	303.0	80	342.9		
18	247.4	50	305.9	82	345.0		
20	252.4	52	308.7	84	347.2		
22	257.1	54	311.4	86	349.3		
24	261.5	56	314.1	88	351.4		
26	265.7	58	316.7	90	353.5		
28	269.8	60	319.3	92	355.5		
30	273.6	62	321.8	94	357.6		



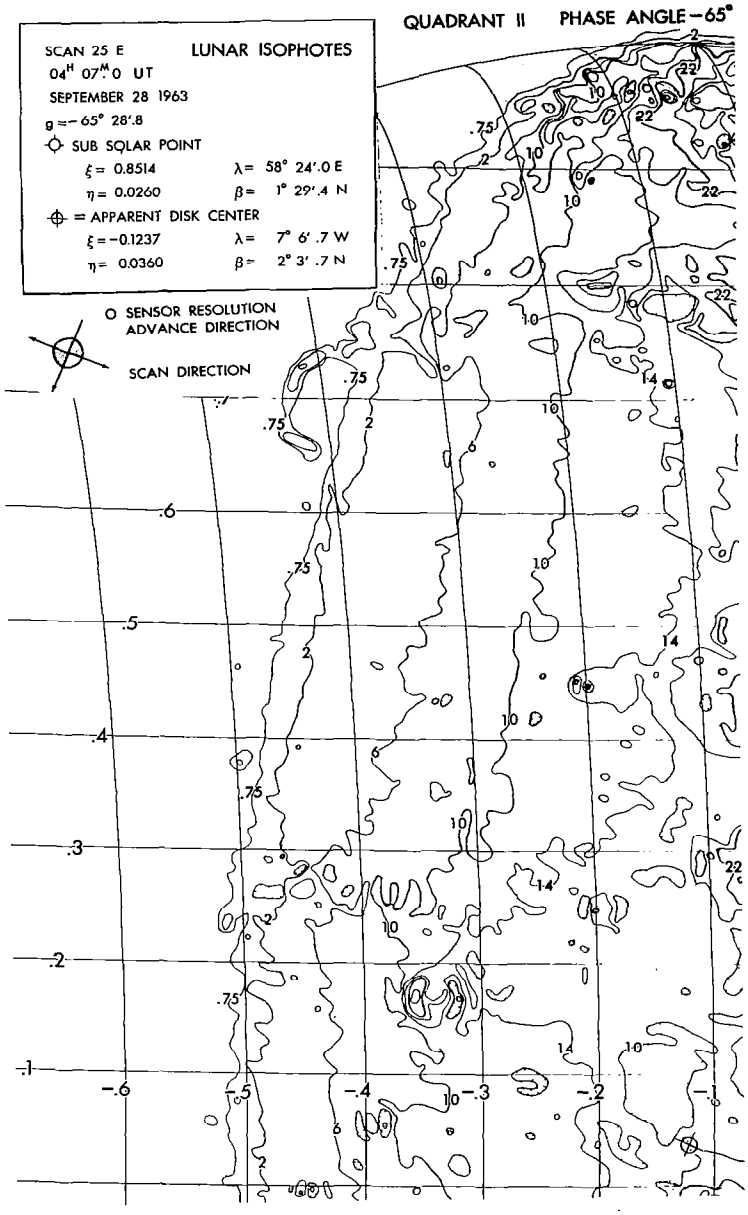
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	26.67
.75	.34	62	28.51
2	.92	66	30.35
6	2.76	70	32.19
10	4.60	74	34.03
14	6.44	78	35.87
18	8.28	82	37.70
22	10.12	86	38.54
26	11.96	90	41.38
30	13.80	94	43.22
34	15.63	98	45.06
38	17.47	102	46.90
42	19.31	106	48.74
46	21.15	110	50.58
50	22.99	114	52.42
54	24.83		



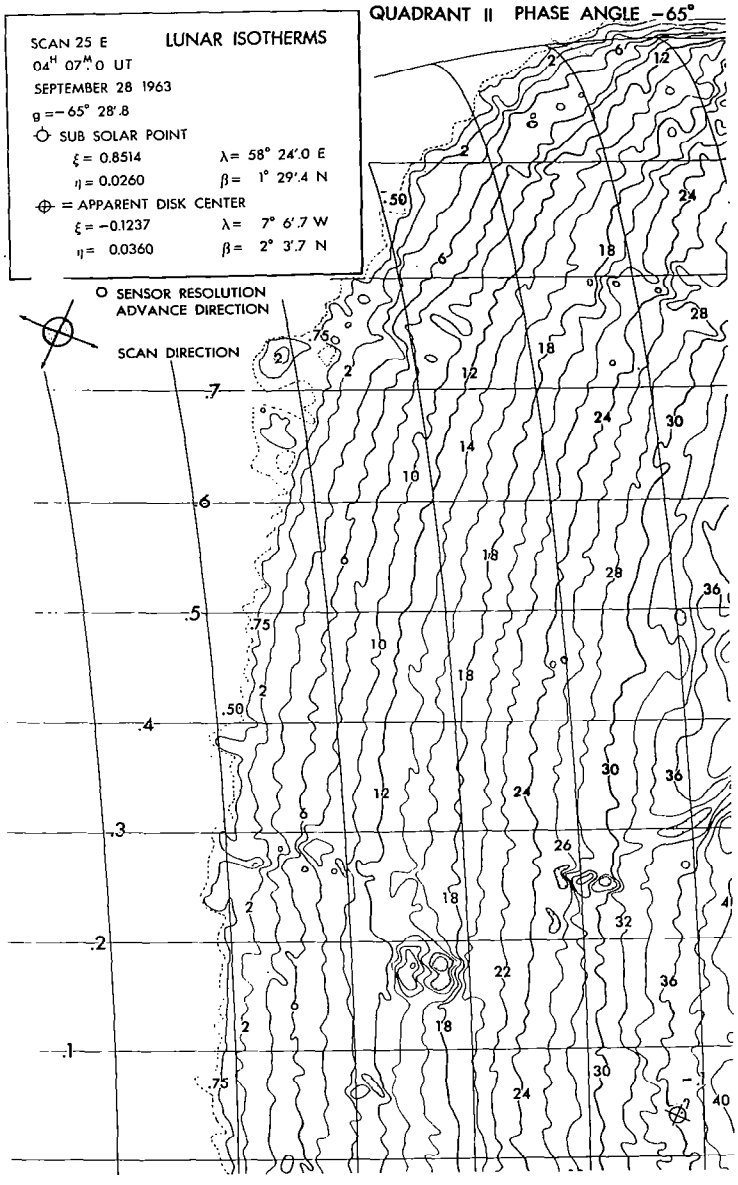
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.25	141.2	30	290.7	62	345.4
.75	160.2	32	294.9	64	348.2
2	181.9	34	298.9	66	351.0
4	201.3	36	302.8	68	353.8
6	214.6	38	306.6	70	356.5
8	225.2	40	310.2	72	359.2
10	234.1	42	313.8	74	361.8
12	241.9	44	317.3	76	364.4
14	249.0	46	320.7	78	367.0
16	255.4	48	324.0	80	369.6
18	261.4	50	327.2	82	372.1
20	266.9	52	330.4	84	374.6
22	272.2	54	333.5	86	377.0
24	277.1	56	336.6	88	379.4
26	281.9	58	339.6	90	381.8
28	286.4	60	342.5	92	384.2



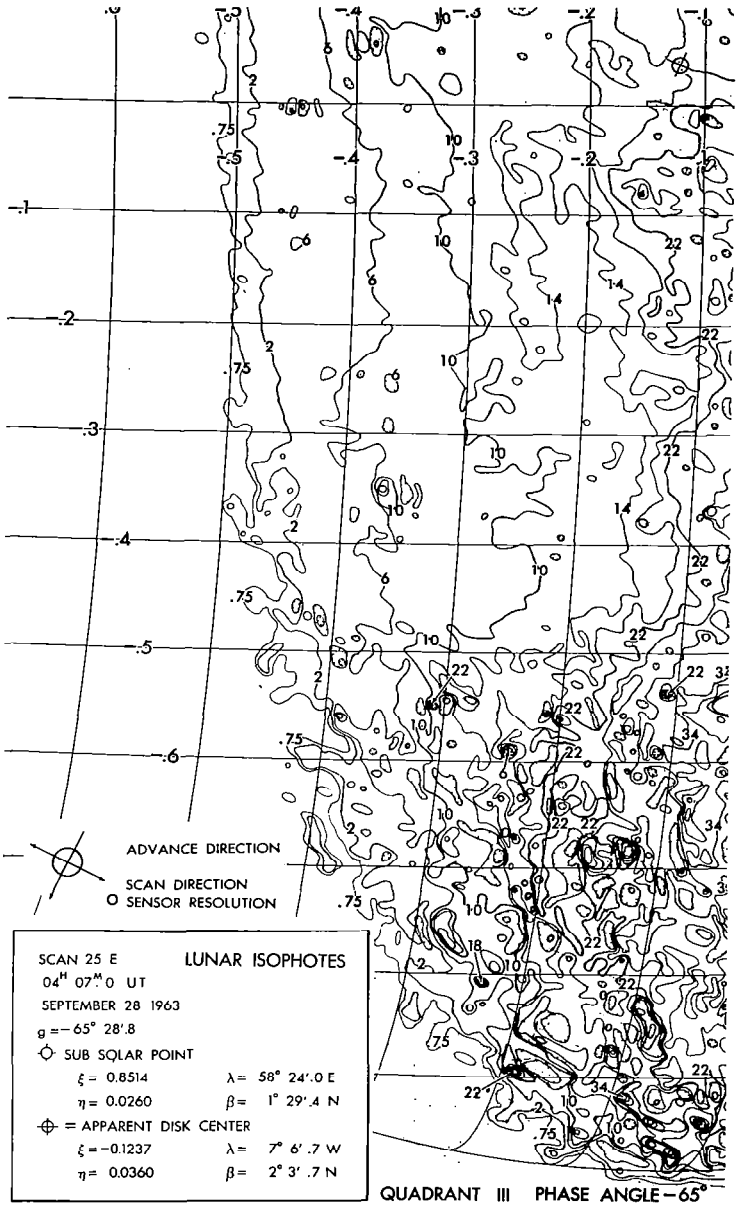
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	26.67
.75	.34	62	28.51
2	.92	66	30.35
6	2.76	70	32.19
10	4.60	74	34.03
14	6.44	78	35.87
18	8.28	82	37.70
22	10.12	86	38.54
26	11.96	90	41.38
30	13.80	94	43.22
34	15.63	98	45.06
38	17.47	102	46.90
42	19.31	106	48.74
46	21.15	110	50.58
50	22.99	114	52.42
54	24.83		



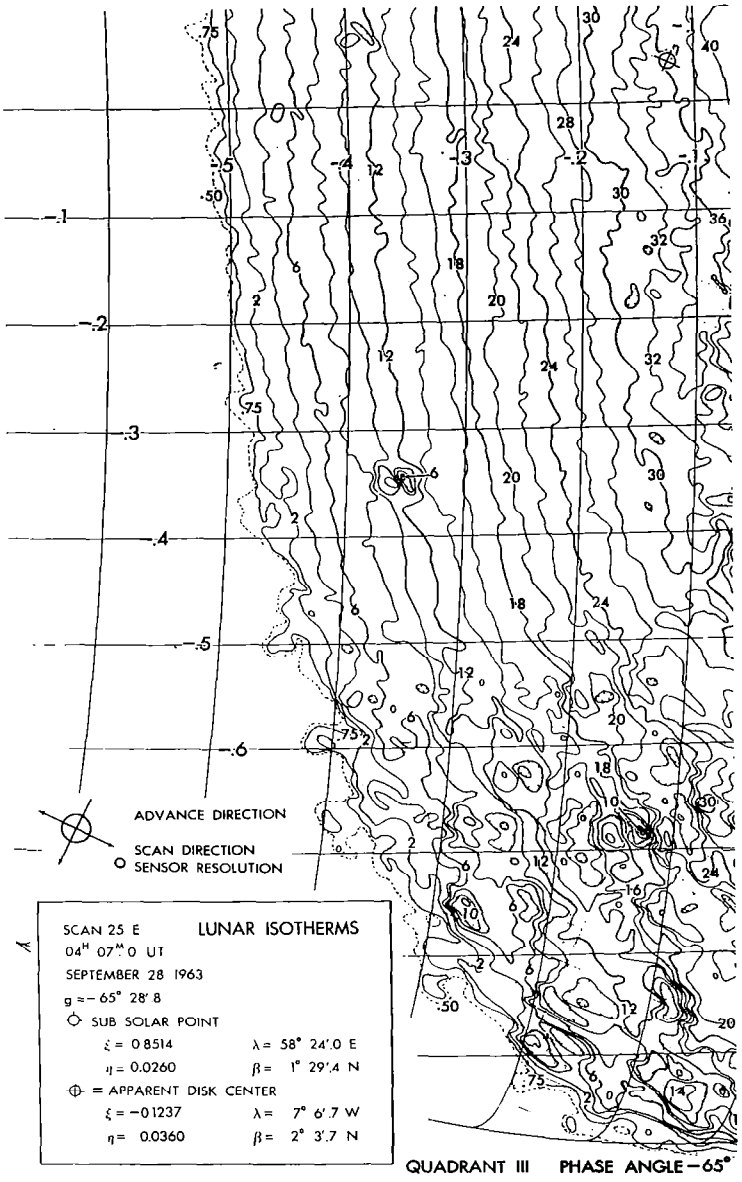
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.25	141.2	30	290.7	62	345.4
.75	160.2	32	294.9	64	348.2
2	181.9	34	298.9	66	351.0
4	201.3	36	302.8	68	353.8
6	214.6	38	306.6	70	356.5
8	225.2	40	310.2	72	359.2
10	234.1	42	313.8	74	361.8
12	241.9	44	317.3	76	364.4
14	249.0	46	320.7	78	367.0
16	255.4	48	324.0	80	369.6
18	261.4	50	327.2	82	372.1
20	266.9	52	330.4	84	374.6
22	272.2	54	333.5	86	377.0
24	277.1	56	336.6	88	379.4
26	281.9	58	339.6	90	381.8
28	286.4	60	342.5	92	384.2



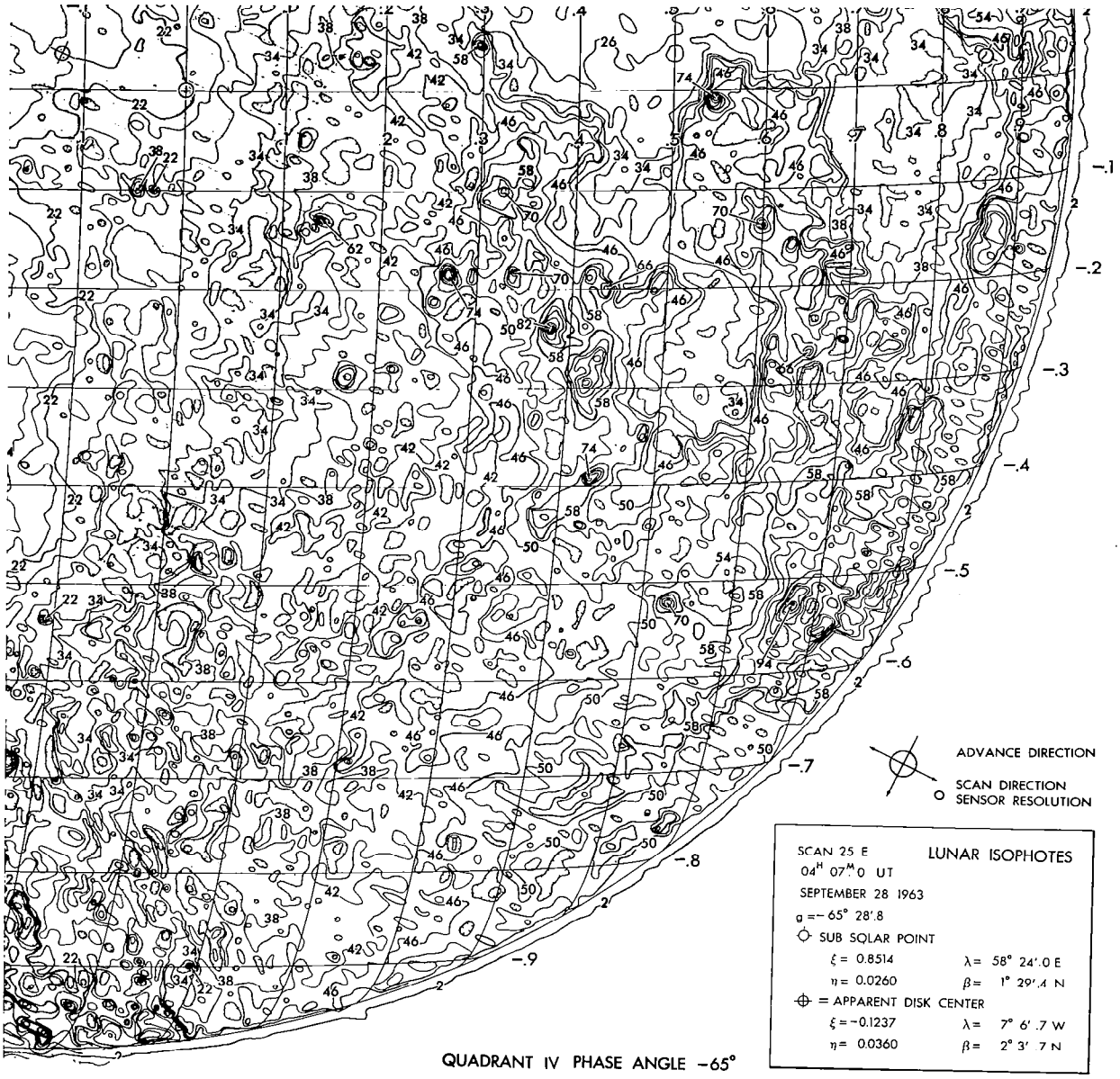
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	26.67
.75	.34	62	28.51
2	.92	66	30.35
6	2.76	70	32.19
10	4.60	74	34.03
14	6.44	78	35.87
18	8.28	82	37.70
22	10.12	86	38.54
26	11.96	90	41.38
30	13.80	94	43.22
34	15.63	98	45.06
38	17.47	102	46.90
42	19.31	106	48.74
46	21.15	110	50.58
50	22.99	114	52.42
54	24.83		



THERMAL CALIBRATION DATA

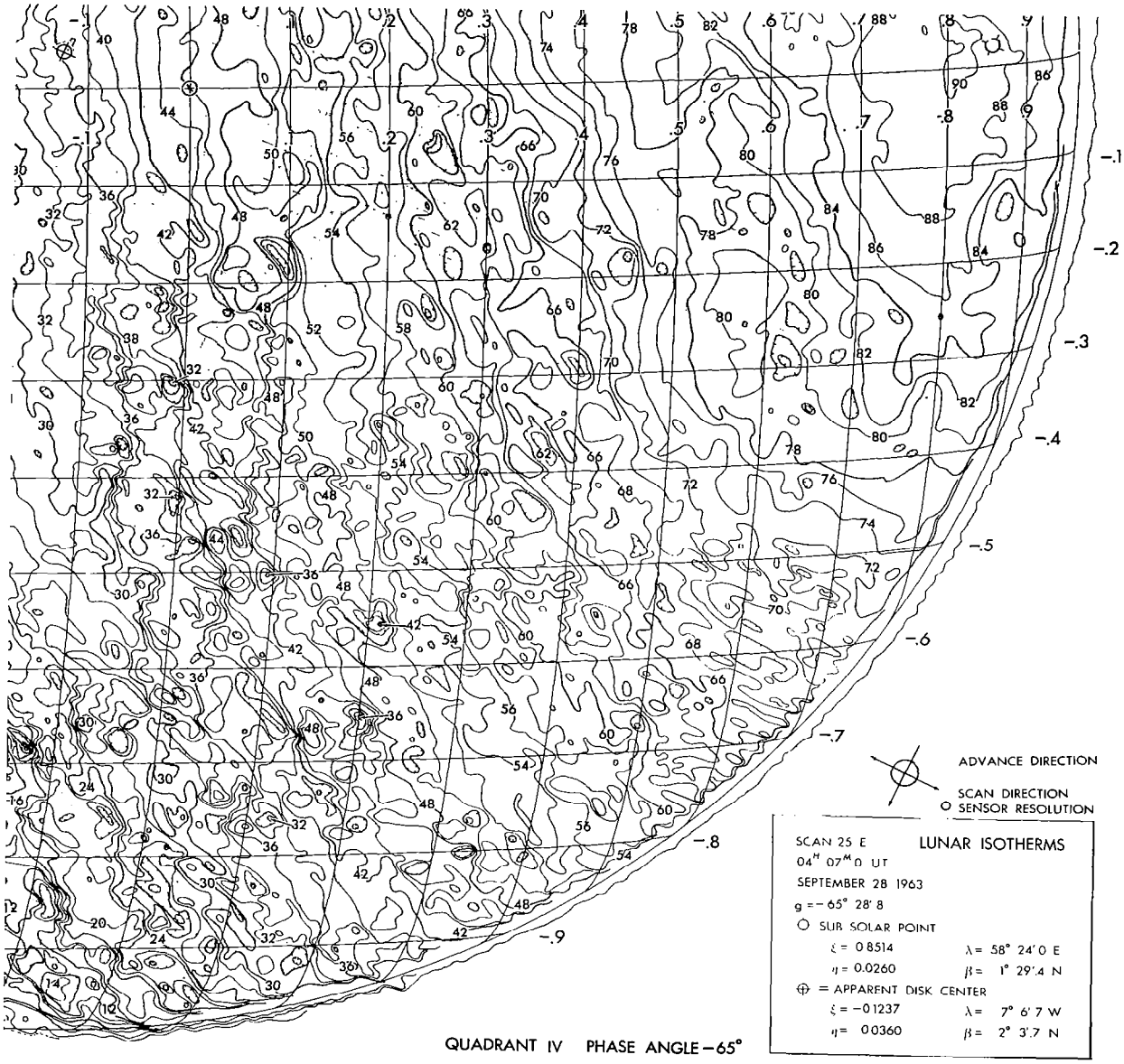
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.25	141.2	30	290.7	62	345.4
.75	160.2	32	294.9	64	348.2
2	181.9	34	298.9	66	351.0
4	201.3	36	302.8	68	353.8
6	214.6	38	306.6	70	356.5
8	225.2	40	310.2	72	359.2
10	234.1	42	313.8	74	361.8
12	241.9	44	317.3	76	364.4
14	249.0	46	320.7	78	367.0
16	255.4	48	324.0	80	369.6
18	261.4	50	327.2	82	372.1
20	266.9	52	330.4	84	374.6
22	272.2	54	333.5	86	377.0
24	277.1	56	336.6	88	379.4
26	281.9	58	339.6	90	381.8
28	286.4	60	342.5	92	384.2



QUADRANT IV PHASE ANGLE −65°

BRIGHTNESS CALIBRATION DATA

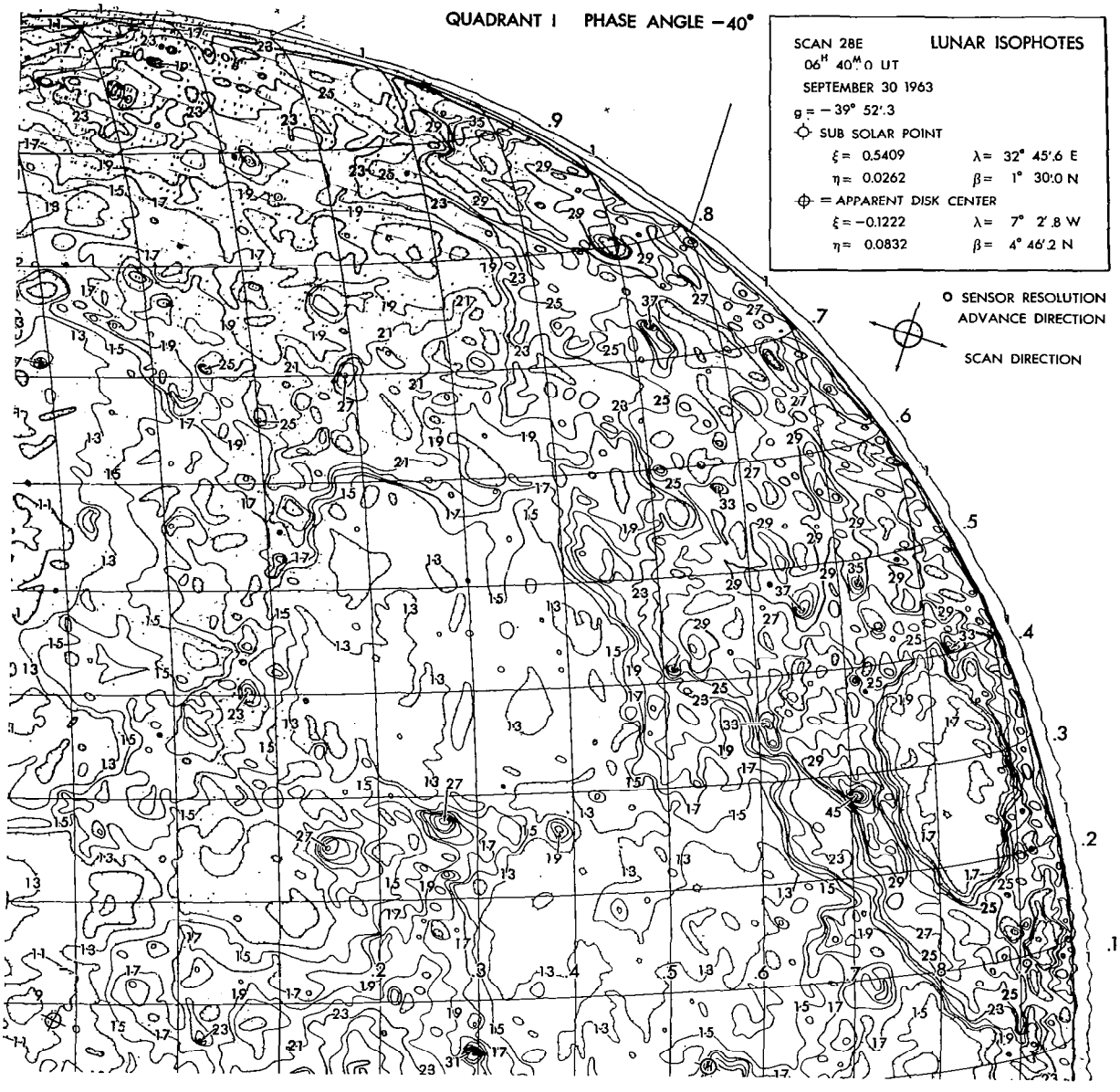
Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	26.67
.75	.34	62	28.51
2	.92	66	30.35
6	2.76	70	32.19
10	4.60	74	34.03
14	6.44	78	35.87
18	8.28	82	37.70
22	10.12	86	38.54
26	11.96	90	41.38
30	13.80	94	43.22
34	15.63	98	45.06
38	17.47	102	46.90
42	19.31	106	48.74
46	21.15	110	50.58
50	22.99	114	52.42
54	24.83		



QUADRANT IV PHASE ANGLE −65°

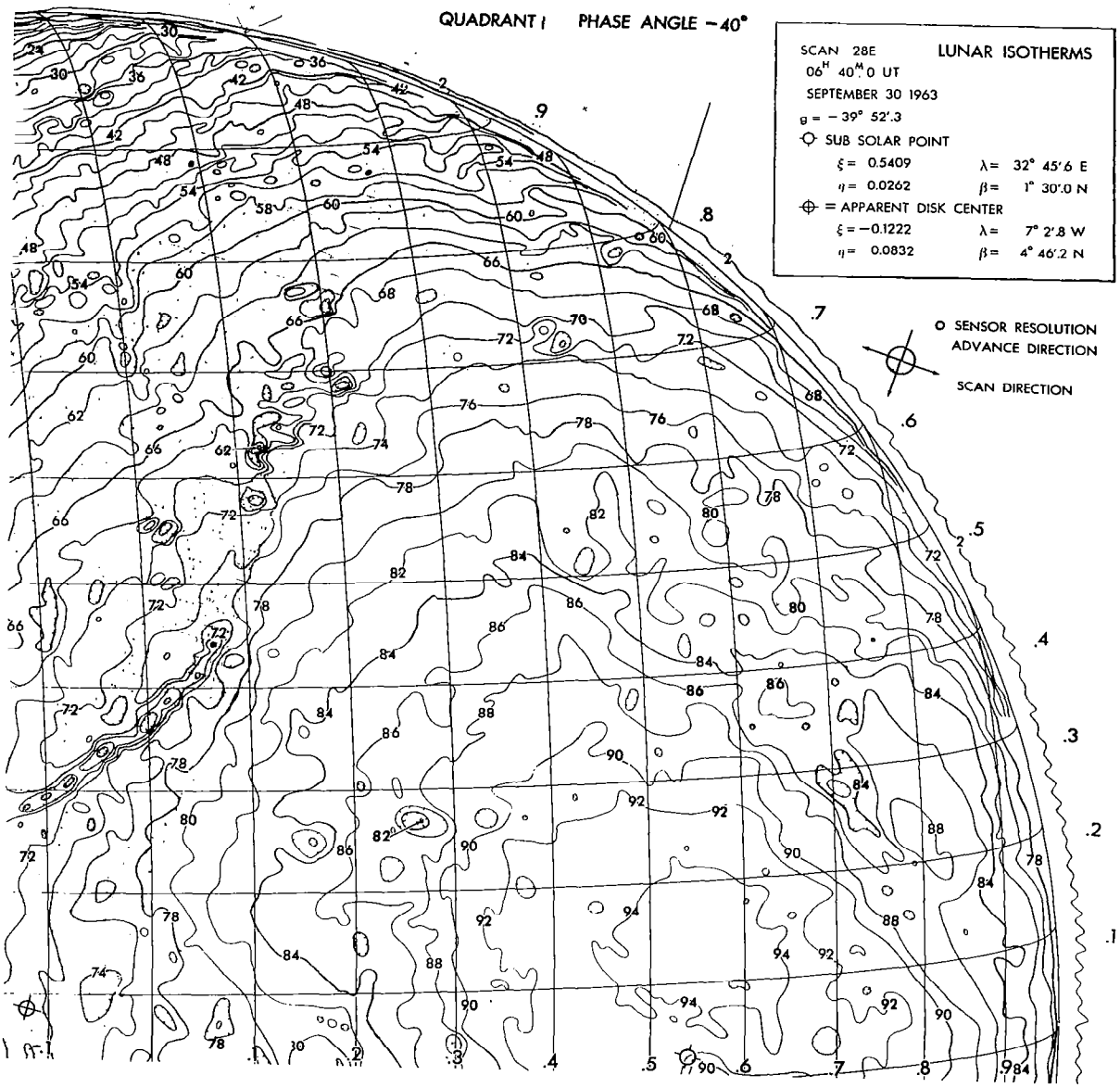
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.25	141.2	30	290.7	62	345.4
.75	160.2	32	294.9	64	348.2
2	181.9	34	298.9	66	351.0
4	201.3	36	302.8	68	353.8
6	214.6	38	306.6	70	356.5
8	225.2	40	310.2	72	359.2
10	234.1	42	313.8	74	361.8
12	241.9	44	317.3	76	364.4
14	249.0	46	320.7	78	367.0
16	255.4	48	324.0	80	369.6
18	261.4	50	327.2	82	372.1
20	266.9	52	330.4	84	374.6
22	272.2	54	333.5	86	377.0
24	277.1	56	336.6	88	379.4
26	281.9	58	339.6	90	381.8
28	286.4	60	342.5	92	384.2



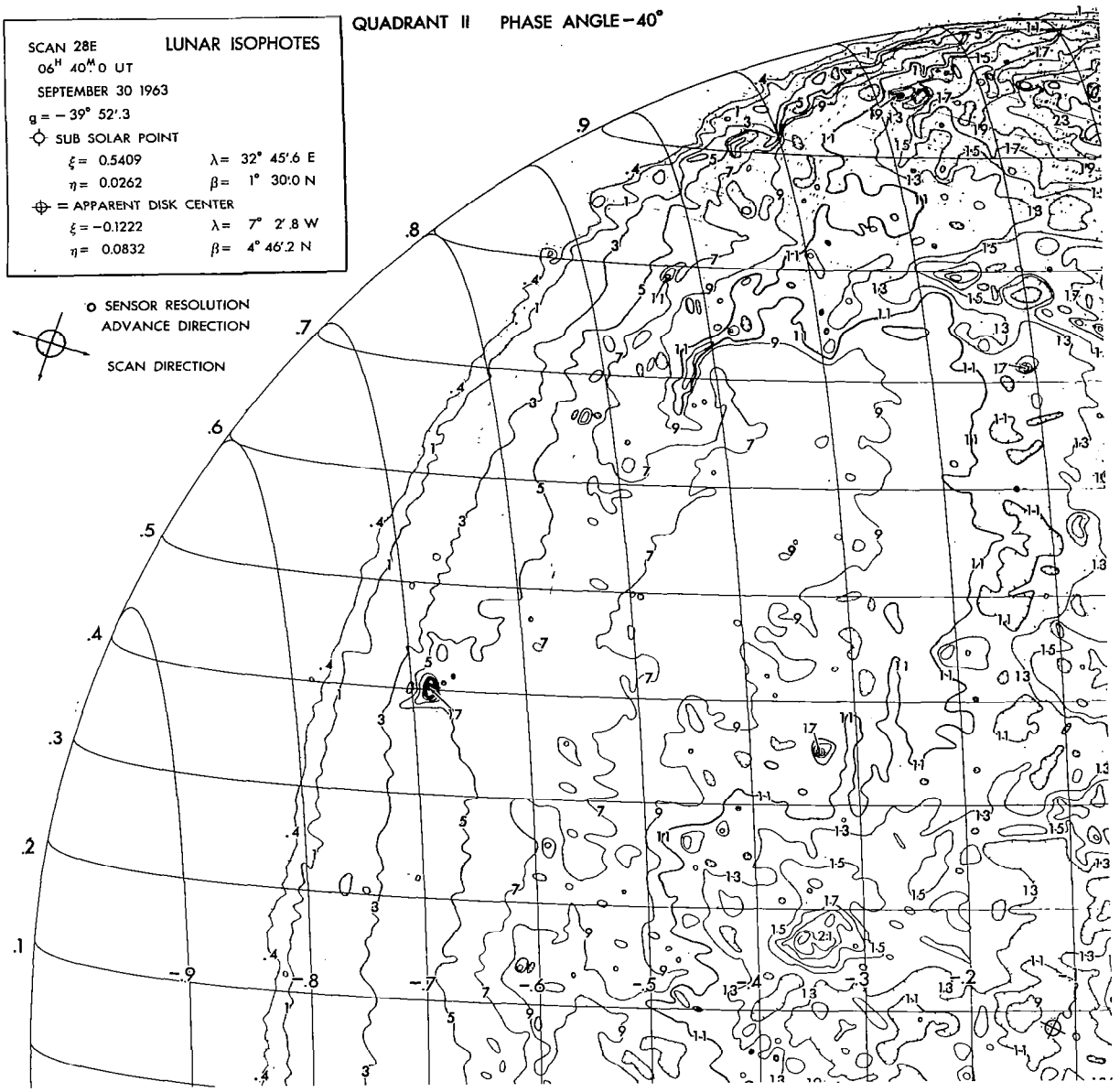
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.17	29	39.36
.40	.51	31	42.07
1	1.36	33	44.78
3	4.07	35	47.50
5	6.79	37	50.21
7	9.50	39	52.93
9	12.21	41	55.65
11	14.93	43	58.35
13	17.64	45	61.07
15	20.36	47	63.79
17	23.04	49	66.50
19	25.78	51	69.21
21	28.50	53	71.93
23	31.21	55	74.64
25	33.93		
27	36.64		



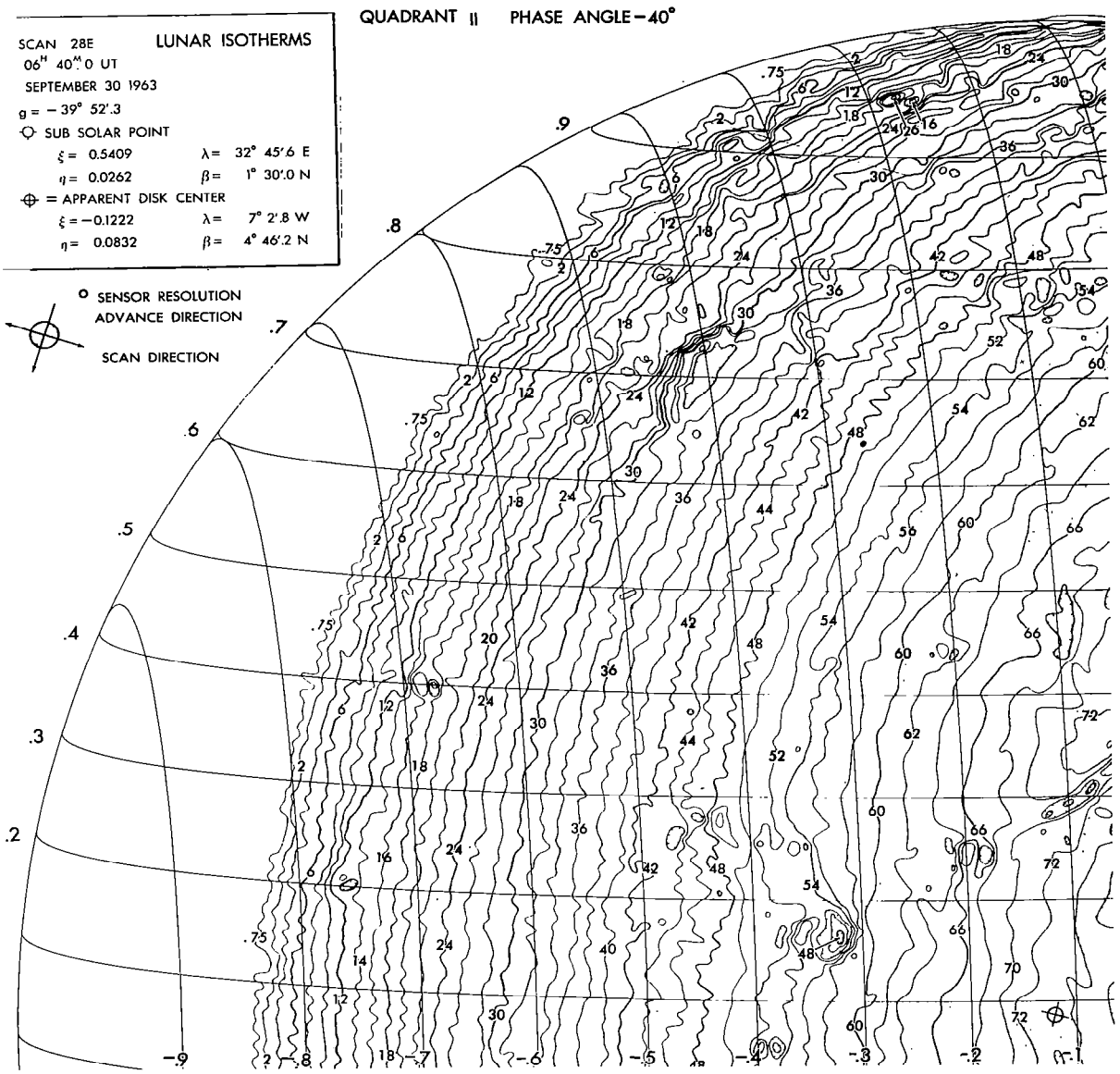
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.6	32	299.5	64	354.6	96	396.8
2	183.7	34	303.6	66	357.5		
4	203.4	36	307.7	68	360.4		
6	217.1	38	311.6	70	363.2		
8	227.9	40	315.3	72	365.9		
10	237.0	42	319.0	74	368.7		
12	245.1	44	322.6	76	371.4		
14	252.3	46	326.1	78	374.1		
16	258.9	48	329.5	80	376.7		
18	265.0	50	332.9	82	379.3		
20	270.7	52	336.2	84	381.9		
22	276.1	54	339.4	86	384.4		
24	281.2	56	342.5	88	386.9		
26	286.1	58	345.6	90	389.4		
28	290.7	60	348.7	92	391.9		
30	295.2	62	351.7	94	394.3		



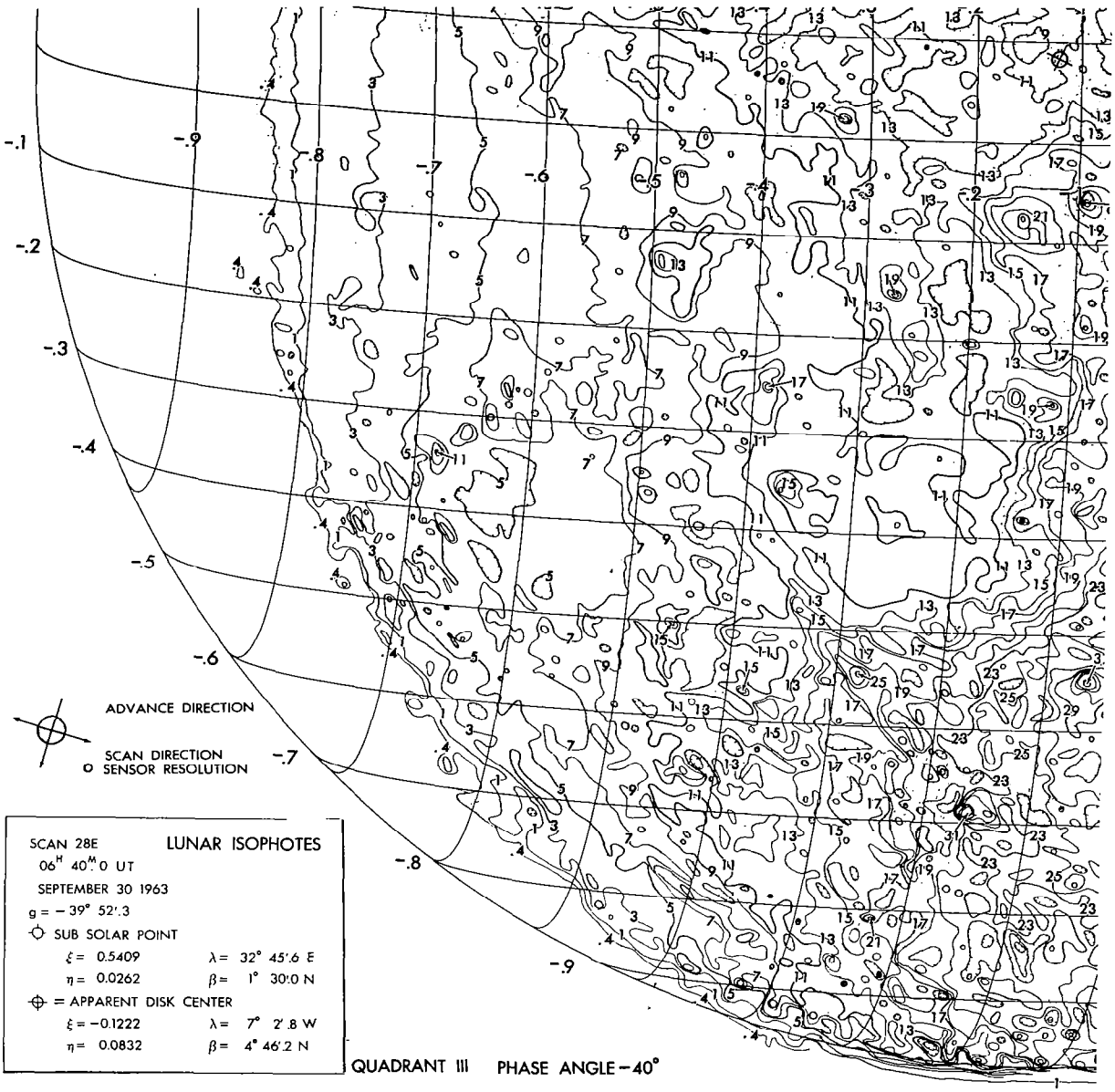
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.17	29	39.36
.40	.51	31	42.07
1	1.36	33	44.78
3	4.07	35	47.50
5	6.79	37	50.21
7	9.50	39	52.93
9	12.21	41	55.65
11	14.93	43	58.35
13	17.64	45	61.07
15	20.36	47	63.79
17	23.04	49	66.50
19	25.78	51	69.21
21	28.50	53	71.93
23	31.21	55	74.64
25	33.93		
27	36.64		



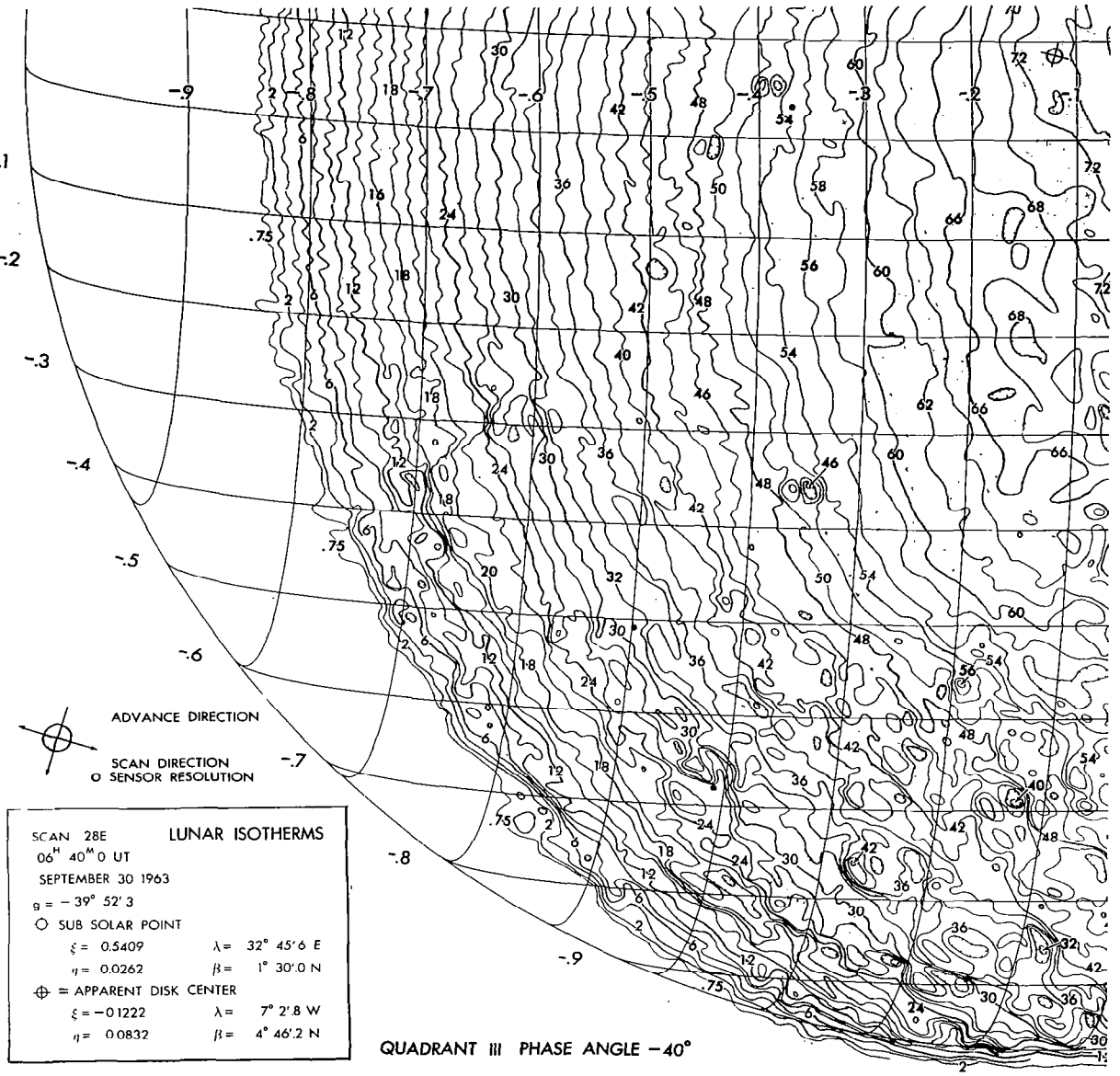
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.6	32	299.5	64	354.6	96	396.8
2	183.7	34	303.6	66	357.5		
4	203.4	36	307.7	68	360.4		
6	217.1	38	311.6	70	363.2		
8	227.9	40	315.3	72	365.9		
10	237.0	42	319.0	74	368.7		
12	245.1	44	322.6	76	371.4		
14	252.3	46	326.1	78	374.1		
16	258.9	48	329.5	80	376.7		
18	265.0	50	332.9	82	379.3		
20	270.7	52	336.2	84	381.9		
22	276.1	54	339.4	86	384.4		
24	281.2	56	342.5	88	386.9		
26	286.1	58	345.6	90	389.4		
28	290.7	60	348.7	92	391.9		
30	295.2	62	351.7	94	394.3		



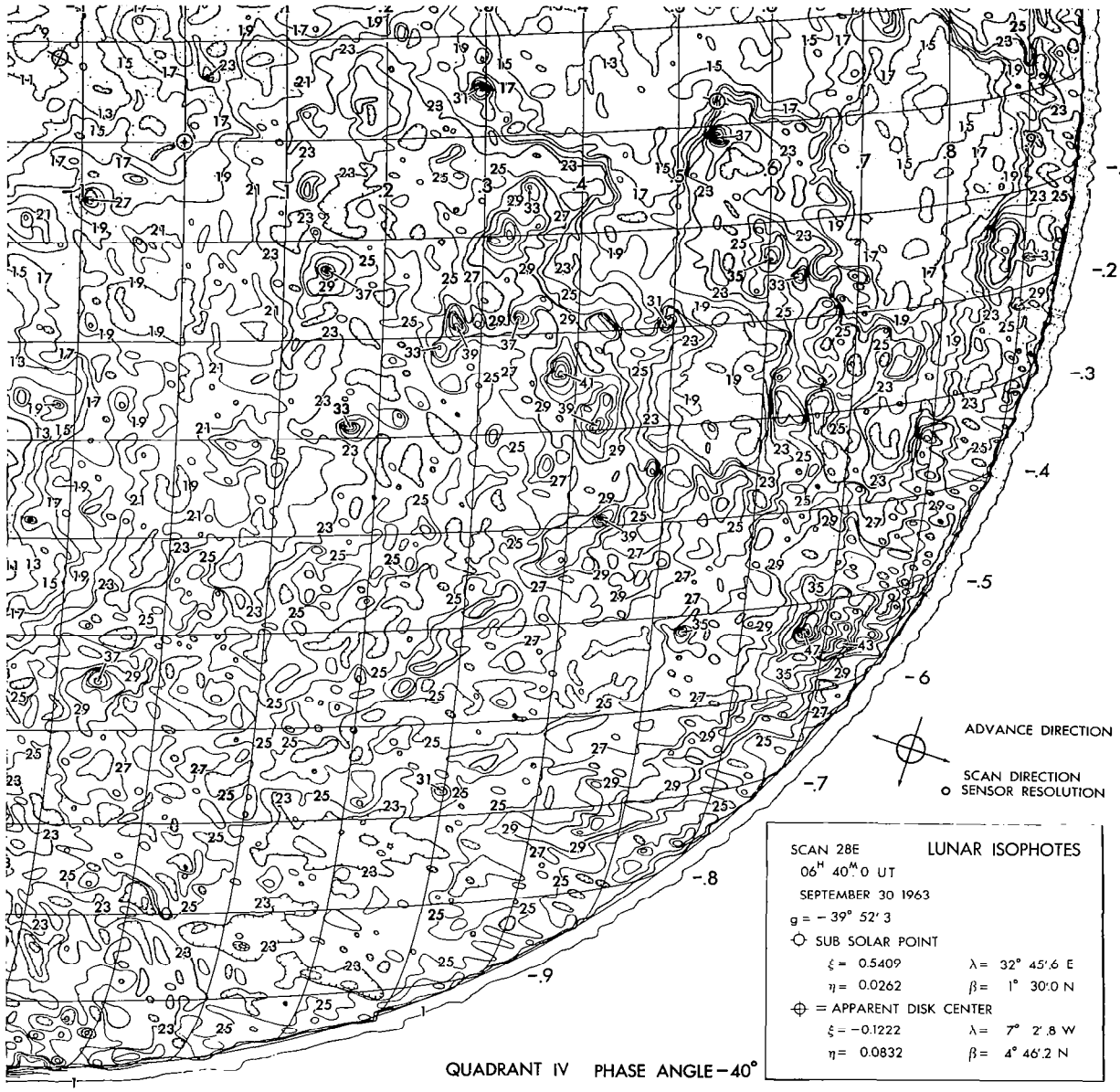
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.17	29	39.36
.40	.51	31	42.07
1	1.36	33	44.78
3	4.07	35	47.50
5	6.79	37	50.21
7	9.50	39	52.93
9	12.21	41	55.65
11	14.93	43	58.35
13	17.64	45	61.07
15	20.36	47	63.79
17	23.04	49	66.50
19	25.78	51	69.21
21	28.50	53	71.93
23	31.21	55	74.64
25	33.93		
27	36.64		



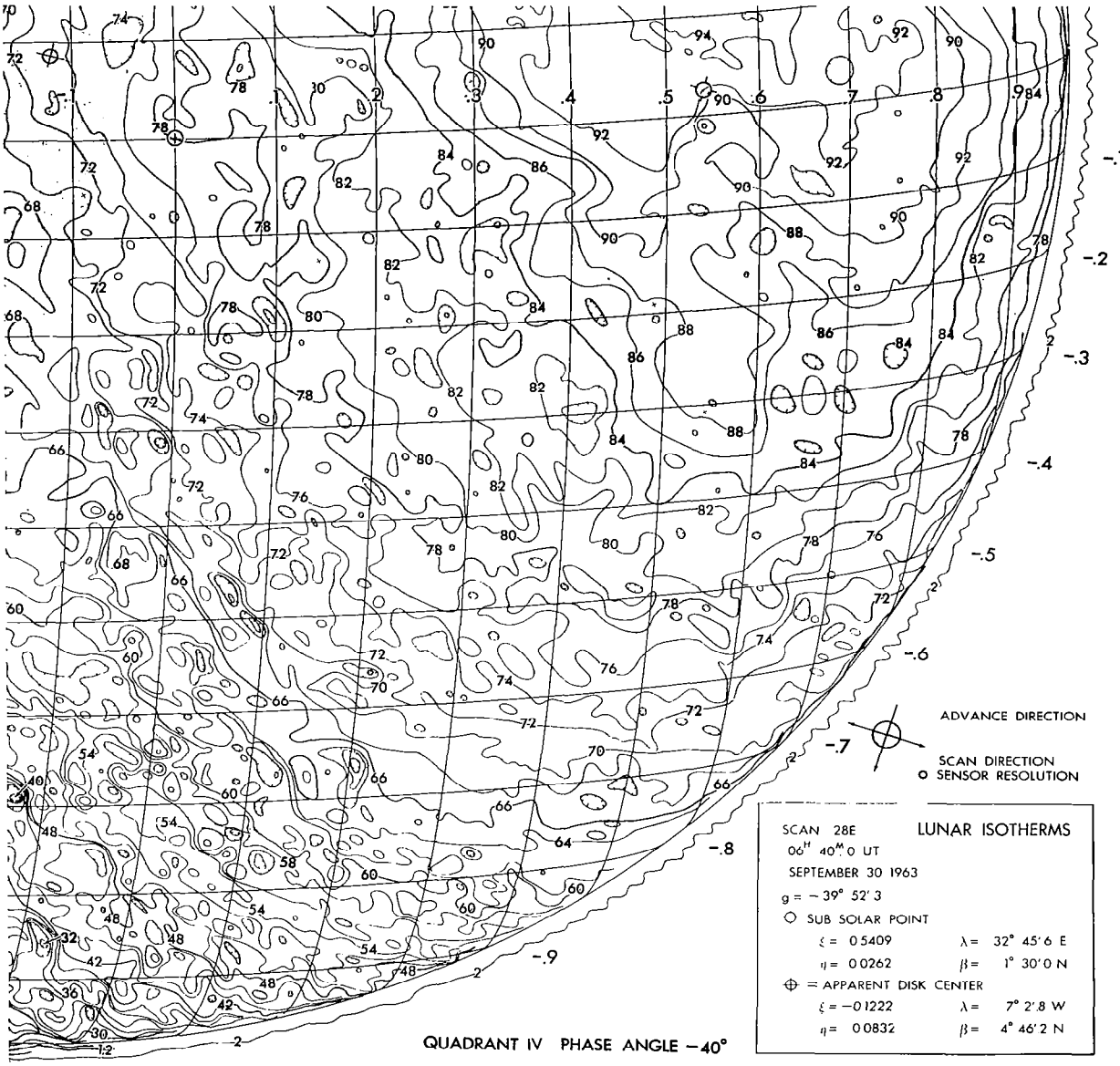
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.6	32	299.5	64	354.6	96	396.8
2	183.7	34	303.6	66	357.5		
4	203.4	36	307.7	68	360.4		
6	217.1	38	311.6	70	363.2		
8	227.9	40	315.3	72	365.9		
10	237.0	42	319.0	74	368.7		
12	245.1	44	322.6	76	371.4		
14	252.3	46	326.1	78	374.1		
16	258.9	48	329.5	80	376.7		
18	265.0	50	332.9	82	379.3		
20	270.7	52	336.2	84	381.9		
22	276.1	54	339.4	86	384.4		
24	281.2	56	342.5	88	386.9		
26	286.1	58	345.6	90	389.4		
28	290.7	60	348.7	92	391.9		
30	295.2	62	351.7	94	394.3		



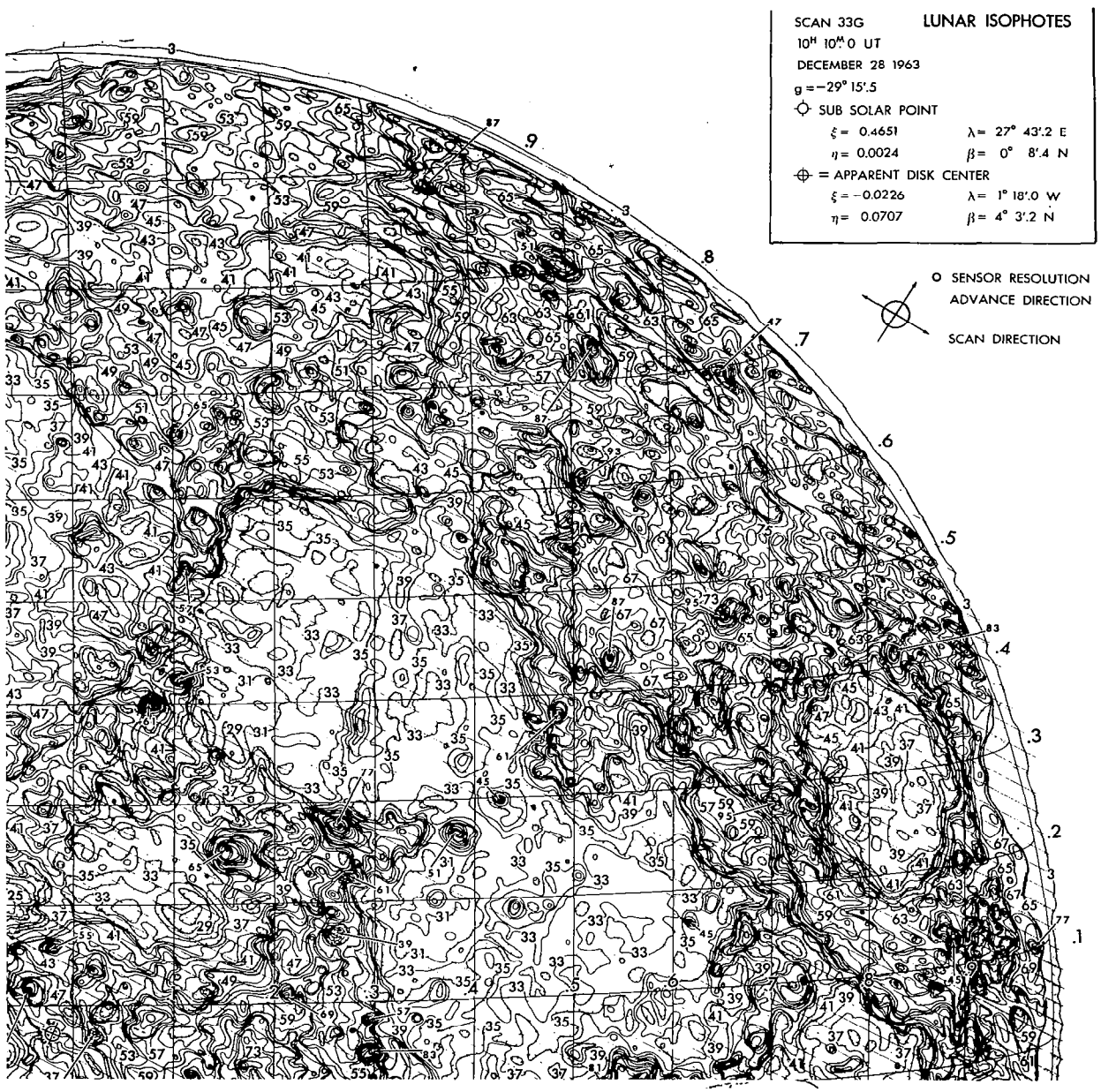
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.17	29	39.36
.40	.51	31	42.07
1	1.36	33	44.78
3	4.07	35	47.50
5	6.79	37	50.21
7	9.50	39	52.93
9	12.21	41	55.65
11	14.93	43	58.35
13	17.64	45	61.07
15	20.36	47	63.79
17	23.04	49	66.50
19	25.78	51	69.21
21	28.50	53	71.93
23	31.21	55	74.64
25	33.93		
27	36.64		



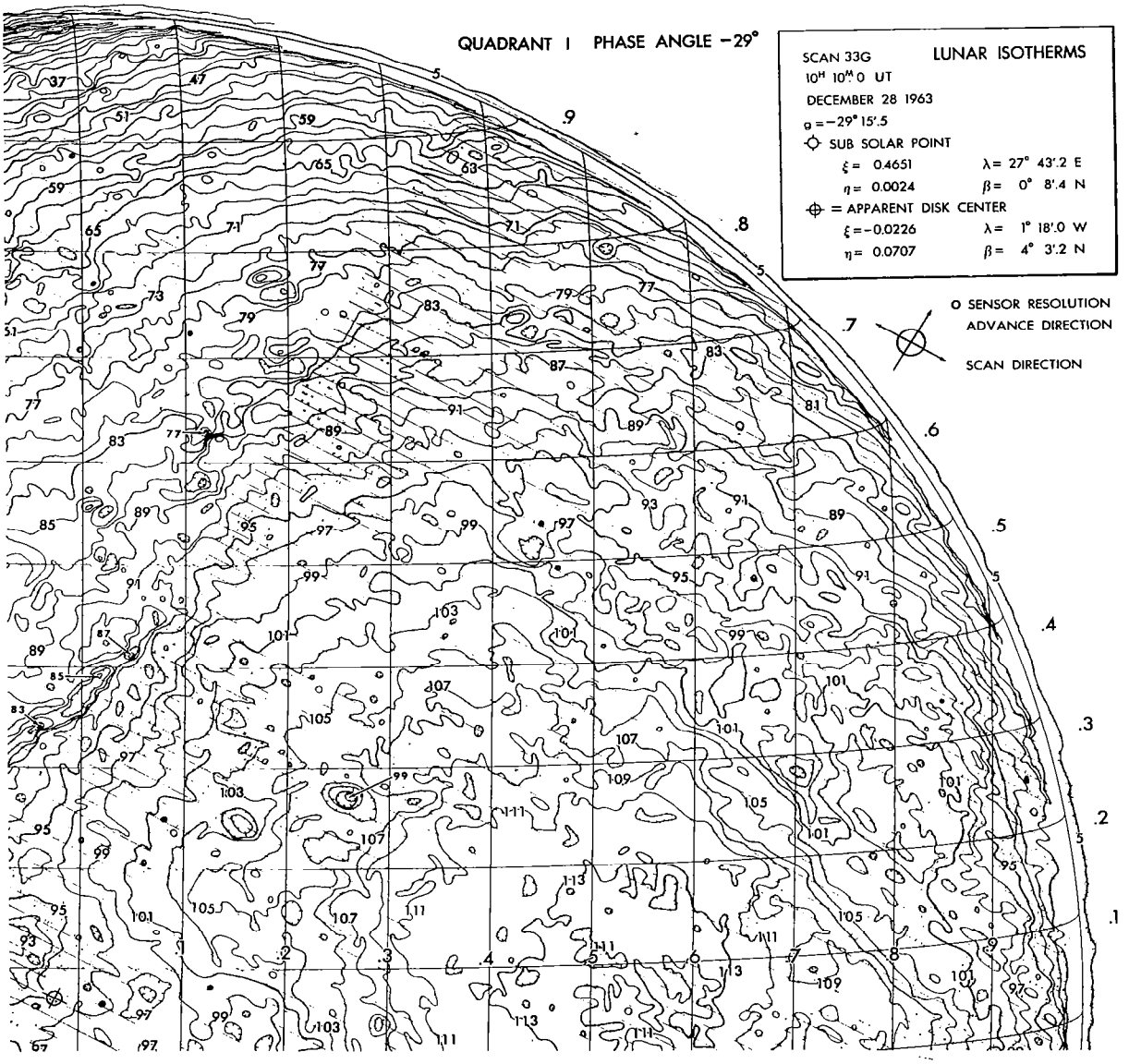
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.6	32	299.5	64	354.6	96	396.8
2	183.7	34	303.6	66	357.5		
4	203.4	36	307.7	68	360.4		
6	217.1	38	311.6	70	363.2		
8	227.9	40	315.3	72	365.9		
10	237.0	42	319.0	74	368.7		
12	245.1	44	322.6	76	371.4		
14	252.3	46	326.1	78	374.1		
16	258.9	48	329.5	80	376.7		
18	265.0	50	332.9	82	379.3		
20	270.7	52	336.2	84	381.9		
22	276.1	54	339.4	86	384.4		
24	281.2	56	342.5	88	386.9		
26	286.1	58	345.6	90	389.4		
28	290.7	60	348.7	92	391.9		
30	295.2	62	351.7	94	394.3		



BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	.61	33	20.05	65	39.50	97	58.94
3	1.82	35	21.27	67	40.71	99	60.16
5	3.04	37	22.48	69	41.23	101	61.37
7	4.25	39	23.70	71	43.14	103	62.59
9	5.47	41	24.91	73	44.36	105	63.80
11	6.68	43	26.13	75	45.57	107	65.02
13	7.90	45	27.34	77	46.79		
15	9.11	47	28.56	79	48.00		
17	10.33	49	29.77	81	49.22		
19	11.55	51	30.99	83	50.43		
21	12.76	53	32.21	85	51.65		
23	13.98	55	33.42	87	52.87		
25	15.19	57	34.64	89	54.08		
27	16.41	59	35.85	91	55.30		
29	17.62	61	37.07	93	56.51		
31	18.84	63	38.28	95	57.73		



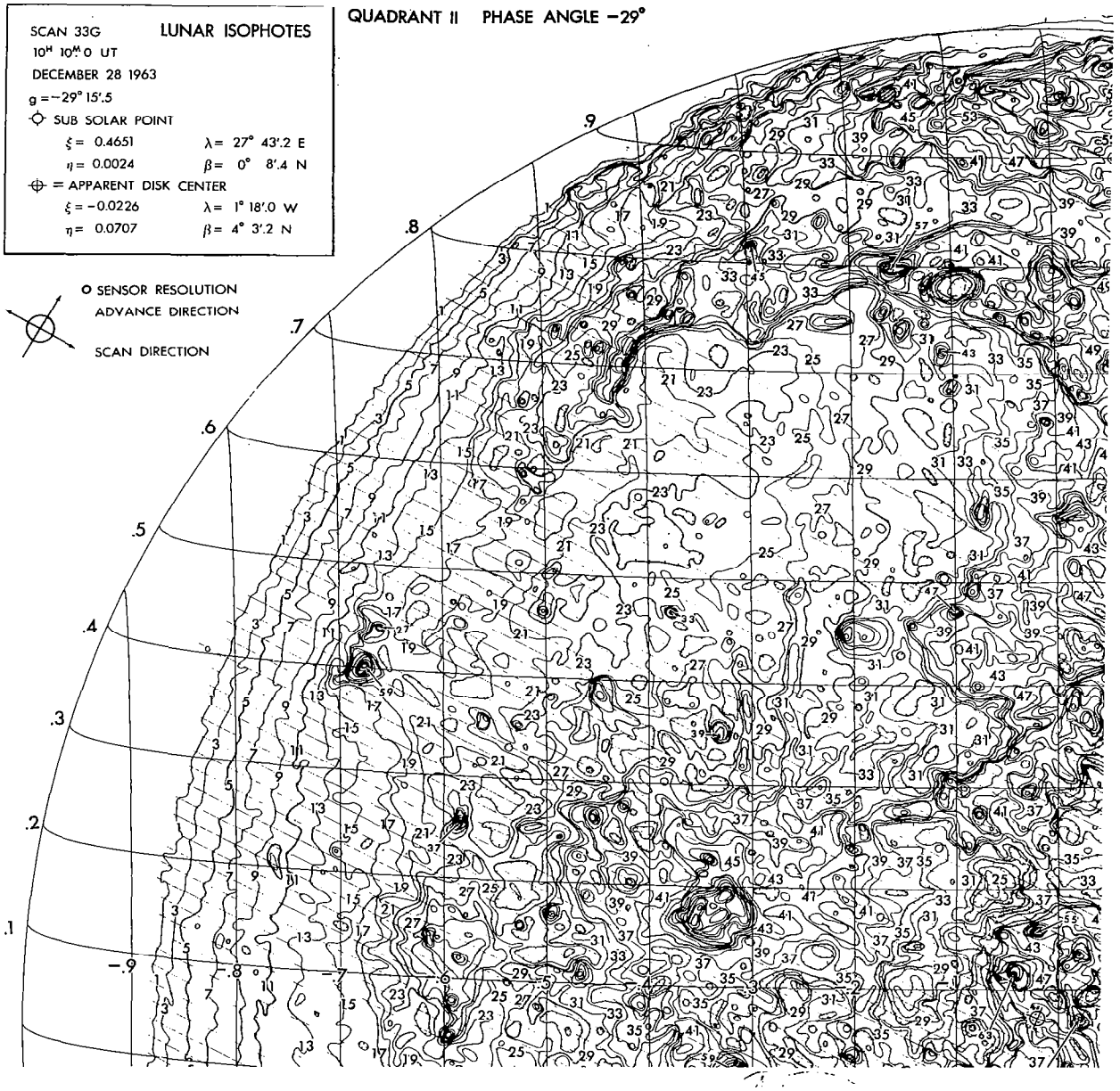
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
1	164.1	33	290.9	65	341.5	97	380.0
3	190.2	35	294.7	67	344.1	99	382.2
5	205.4	37	298.4	69	346.7	101	384.4
7	216.8	39	302.0	71	349.3	103	386.5
9	226.2	41	305.5	73	351.9	105	388.6
11	234.2	43	308.8	75	354.4	107	390.8
13	241.4	45	312.1	77	356.8	109	392.9
15	247.9	47	315.3	79	359.3	111	394.9
17	253.9	49	318.5	81	361.7	113	397.0
19	259.4	51	321.5	83	364.1	115	399.0
21	264.6	53	324.5	85	366.4		
23	269.5	55	327.5	87	368.8		
25	274.2	57	330.4	89	371.1		
27	278.6	59	333.2	91	373.3		
29	282.9	61	336.0	93	375.6		
31	287.0	63	338.8	95	377.8		

SCAN 33G LUNAR ISOPHOTES
$10^H\ 10^M.0$ UT
DECEMBER 28 1963
$g = -29°\ 15'.5$
⊙ SUB SOLAR POINT
$\xi = 0.4651$ $\lambda = 27°\ 43'.2$ E
$\eta = 0.0024$ $\beta = 0°\ 8'.4$ N
⊕ = APPARENT DISK CENTER
$\xi = -0.0226$ $\lambda = 1°\ 18'.0$ W
$\eta = 0.0707$ $\beta = 4°\ 3'.2$ N

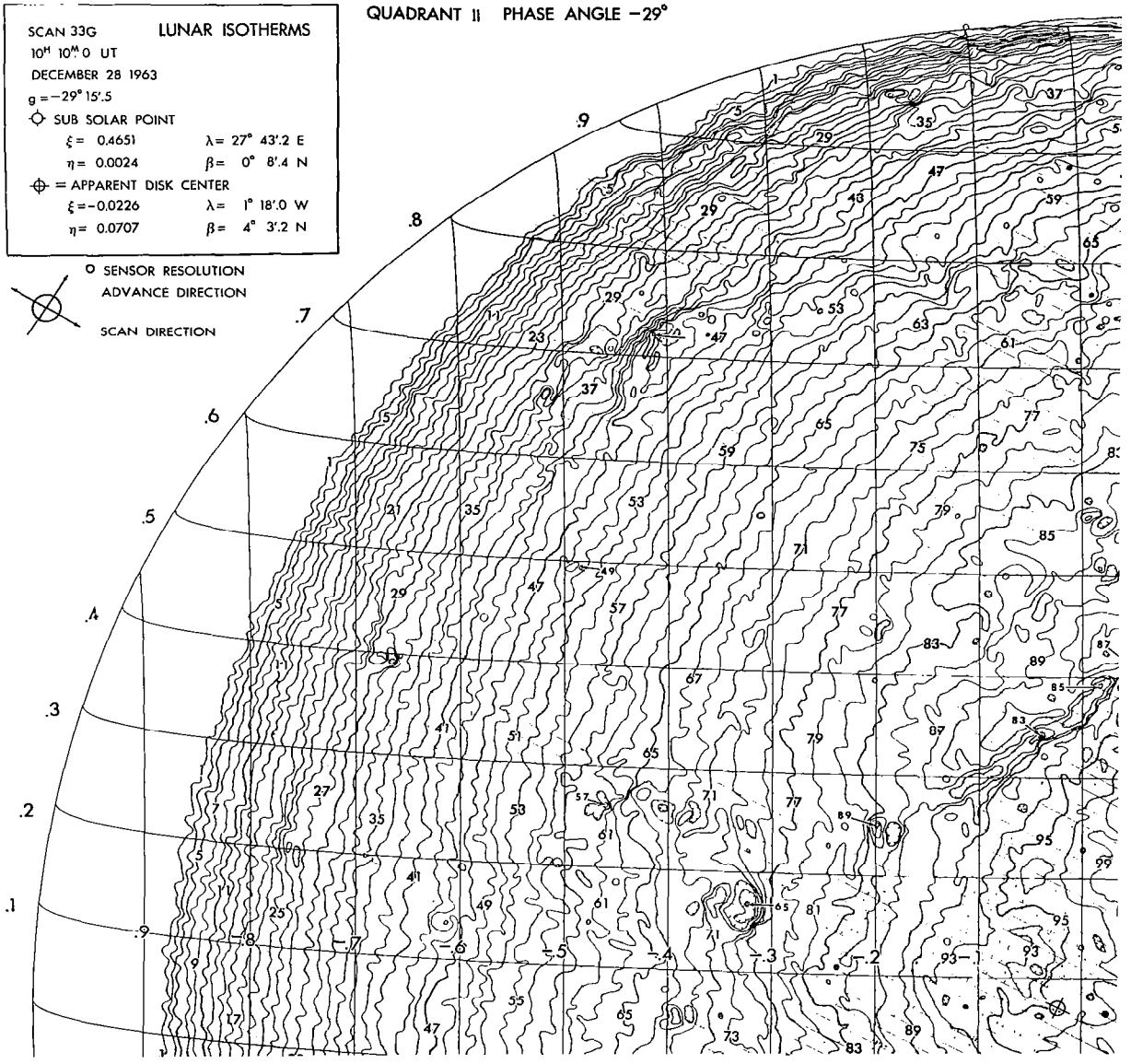
O SENSOR RESOLUTION
ADVANCE DIRECTION
SCAN DIRECTION

QUADRANT II PHASE ANGLE −29°



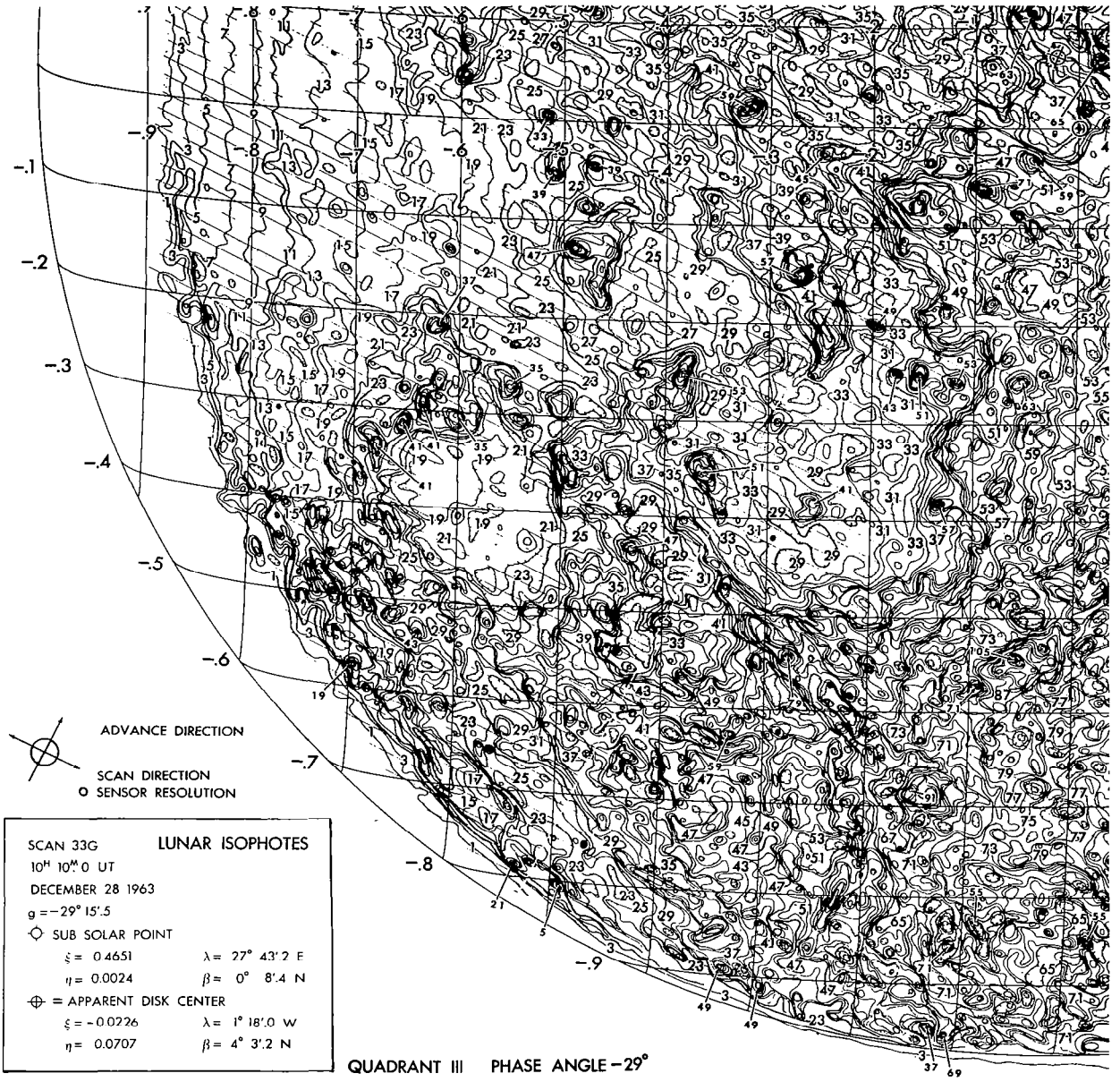
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	.61	33	20.05	65	39.50	97	58.94
3	1.82	35	21.27	67	40.71	99	60.16
5	3.04	37	22.48	69	41.23	101	61.37
7	4.25	39	23.70	71	43.14	103	62.59
9	5.47	41	24.91	73	44.36	105	63.80
11	6.68	43	26.13	75	45.57	107	65.02
13	7.90	45	27.34	77	46.79		
15	9.11	47	28.56	79	48.00		
17	10.33	49	29.77	81	49.22		
19	11.55	51	30.99	83	50.43		
21	12.76	53	32.21	85	51.65		
23	13.98	55	33.42	87	52.87		
25	15.19	57	34.64	89	54.08		
27	16.41	59	35.85	91	55.30		
29	17.62	61	37.07	93	56.51		
31	18.84	63	38.28	95	57.73		



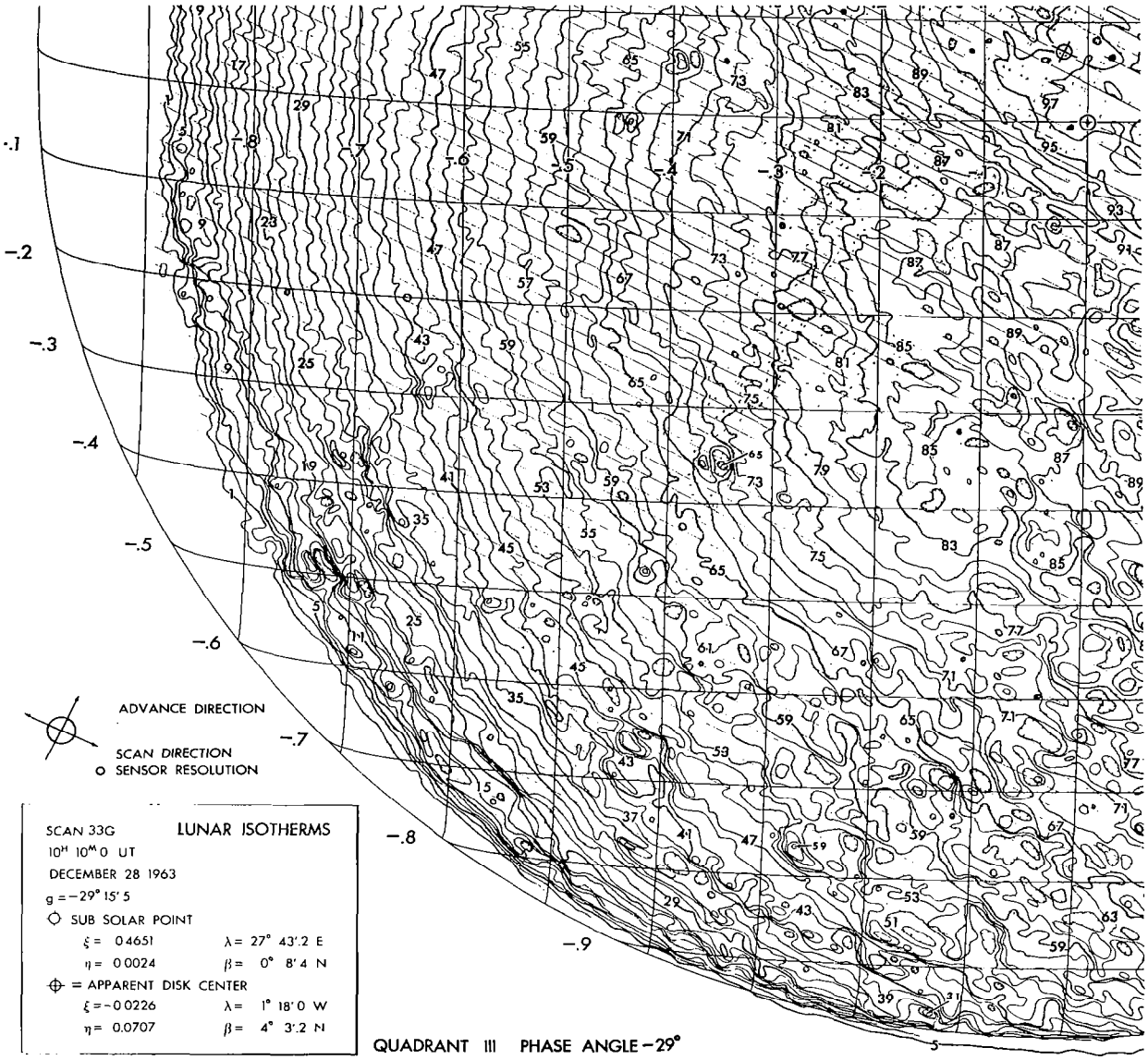
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
1	164.1	33	290.9	65	341.5	97	380.0
3	190.2	35	294.7	67	344.1	99	382.2
5	205.4	37	298.4	69	346.7	101	384.4
7	216.8	39	302.0	71	349.3	103	386.5
9	226.2	41	305.5	73	351.9	105	388.6
11	234.2	43	308.8	75	354.4	107	390.8
13	241.4	45	312.1	77	356.8	109	392.9
15	247.9	47	315.3	79	359.3	111	394.9
17	253.9	49	318.5	81	361.7	113	397.0
19	259.4	51	321.5	83	364.1	115	399.0
21	264.6	53	324.5	85	366.4		
23	269.5	55	327.5	87	368.8		
25	274.2	57	330.4	89	371.1		
27	278.6	59	333.2	91	373.3		
29	282.9	61	336.0	93	375.6		
31	287.0	63	338.8	95	377.8		



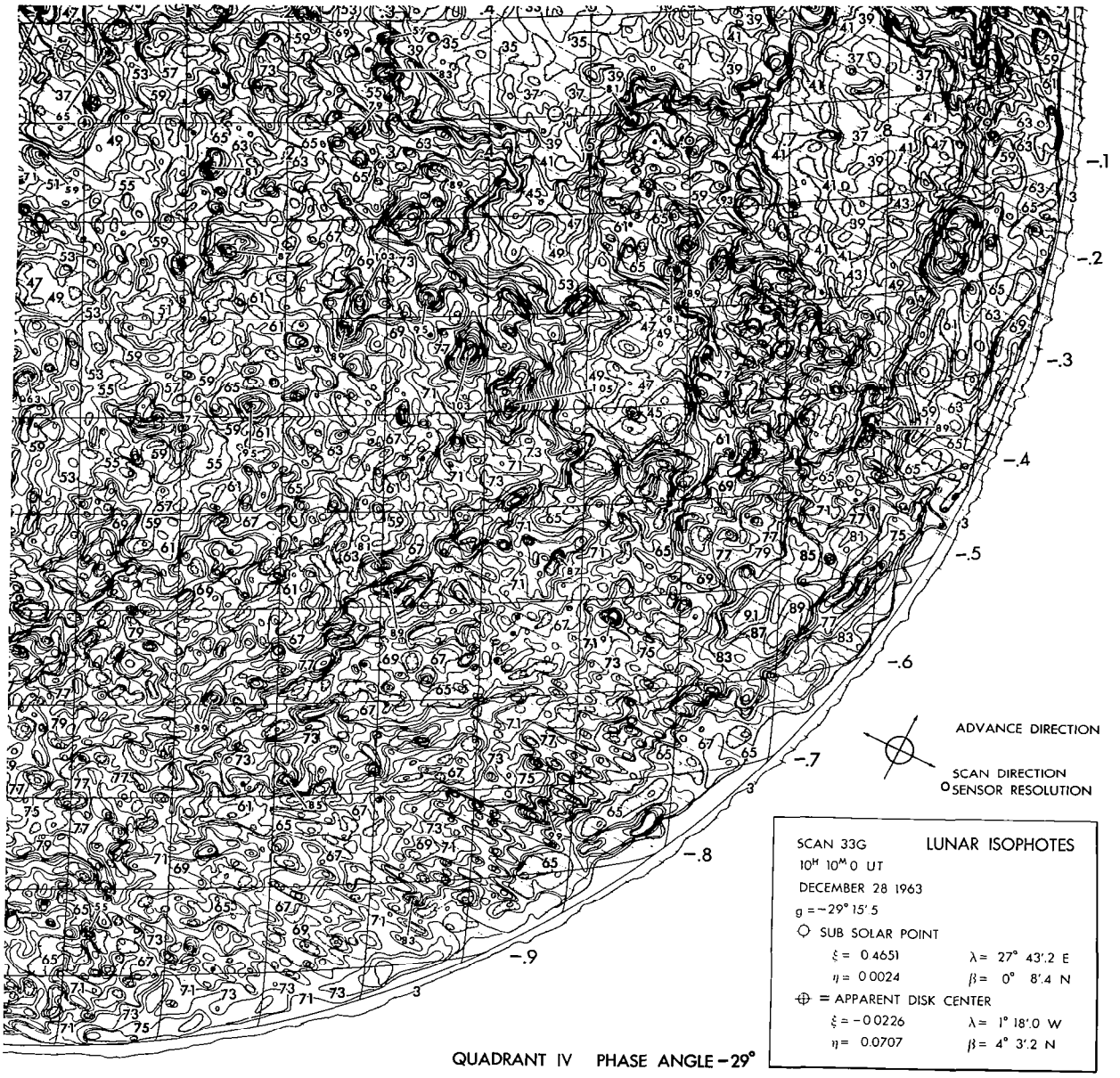
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	.61	33	20.05	65	39.50	97	58.94
3	1.82	35	21.27	67	40.71	99	60.16
5	3.04	37	22.48	69	41.23	101	61.37
7	4.25	39	23.70	71	43.14	103	62.59
9	5.47	41	24.91	73	44.36	105	63.80
11	6.68	43	26.13	75	45.57	107	65.02
13	7.90	45	27.34	77	46.79		
15	9.11	47	28.56	79	48.00		
17	10.33	49	29.77	81	49.22		
19	11.55	51	30.99	83	50.43		
21	12.76	53	32.21	85	51.65		
23	13.98	55	33.42	87	52.87		
25	15.19	57	34.64	89	54.08		
27	16.41	59	35.85	91	55.30		
29	17.62	61	37.07	93	56.51		
31	18.84	63	38.28	95	57.73		



THERMAL CALIBRATION DATA

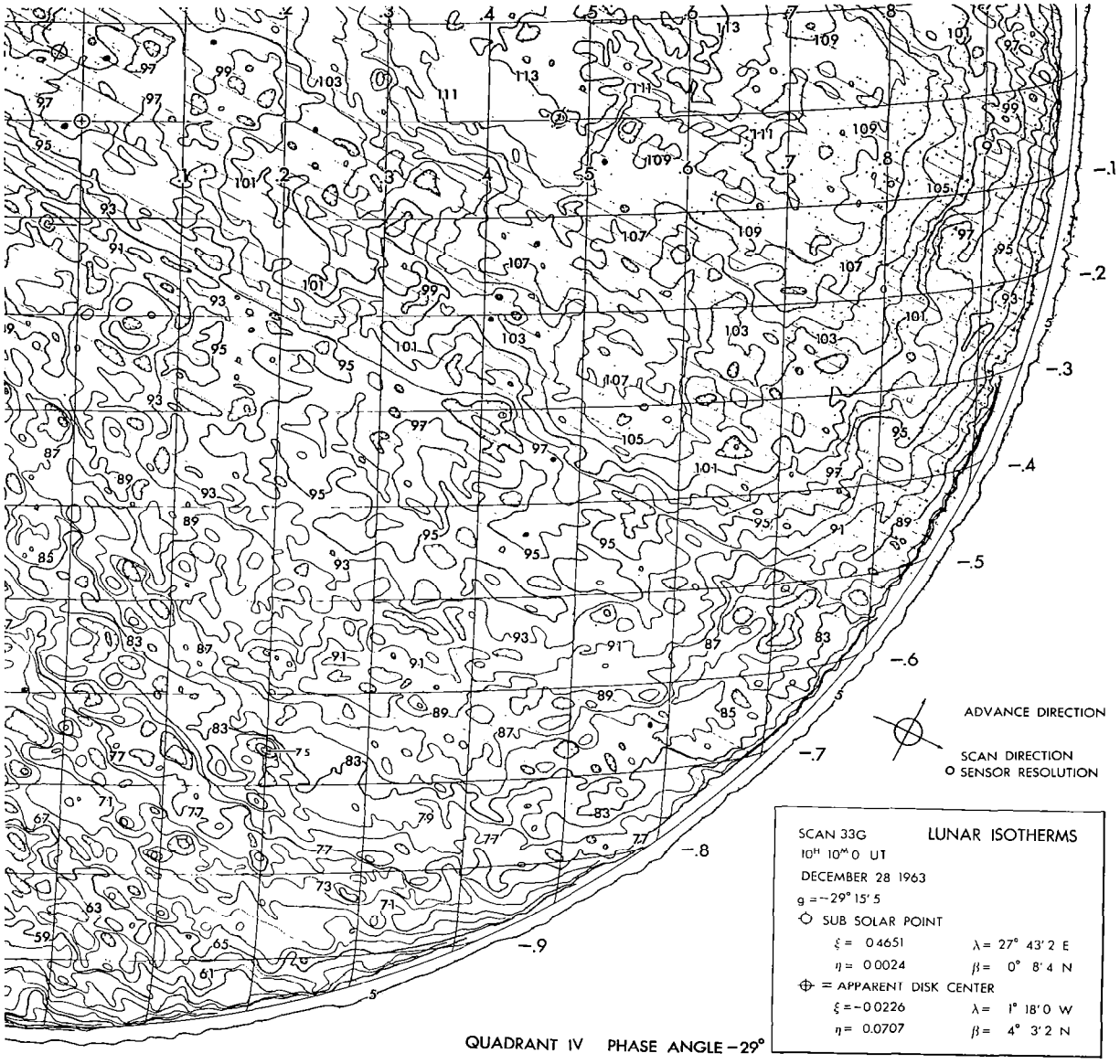
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
1	164.1	33	290.9	65	341.5	97	380.0
3	190.2	35	294.7	67	344.1	99	382.2
5	205.4	37	298.4	69	346.7	101	384.4
7	216.8	39	302.0	71	349.3	103	386.5
9	226.2	41	305.5	73	351.9	105	388.6
11	234.2	43	308.8	75	354.4	107	390.8
13	241.4	45	312.1	77	356.8	109	392.9
15	247.9	47	315.3	79	359.3	111	394.9
17	253.9	49	318.5	81	361.7	113	397.0
19	259.4	51	321.5	83	364.1	115	399.0
21	264.6	53	324.5	85	366.4		
23	269.5	55	327.5	87	368.8		
25	274.2	57	330.4	89	371.1		
27	278.6	59	333.2	91	373.3		
29	282.9	61	336.0	93	375.6		
31	287.0	63	338.8	95	377.8		



QUADRANT IV PHASE ANGLE −29°

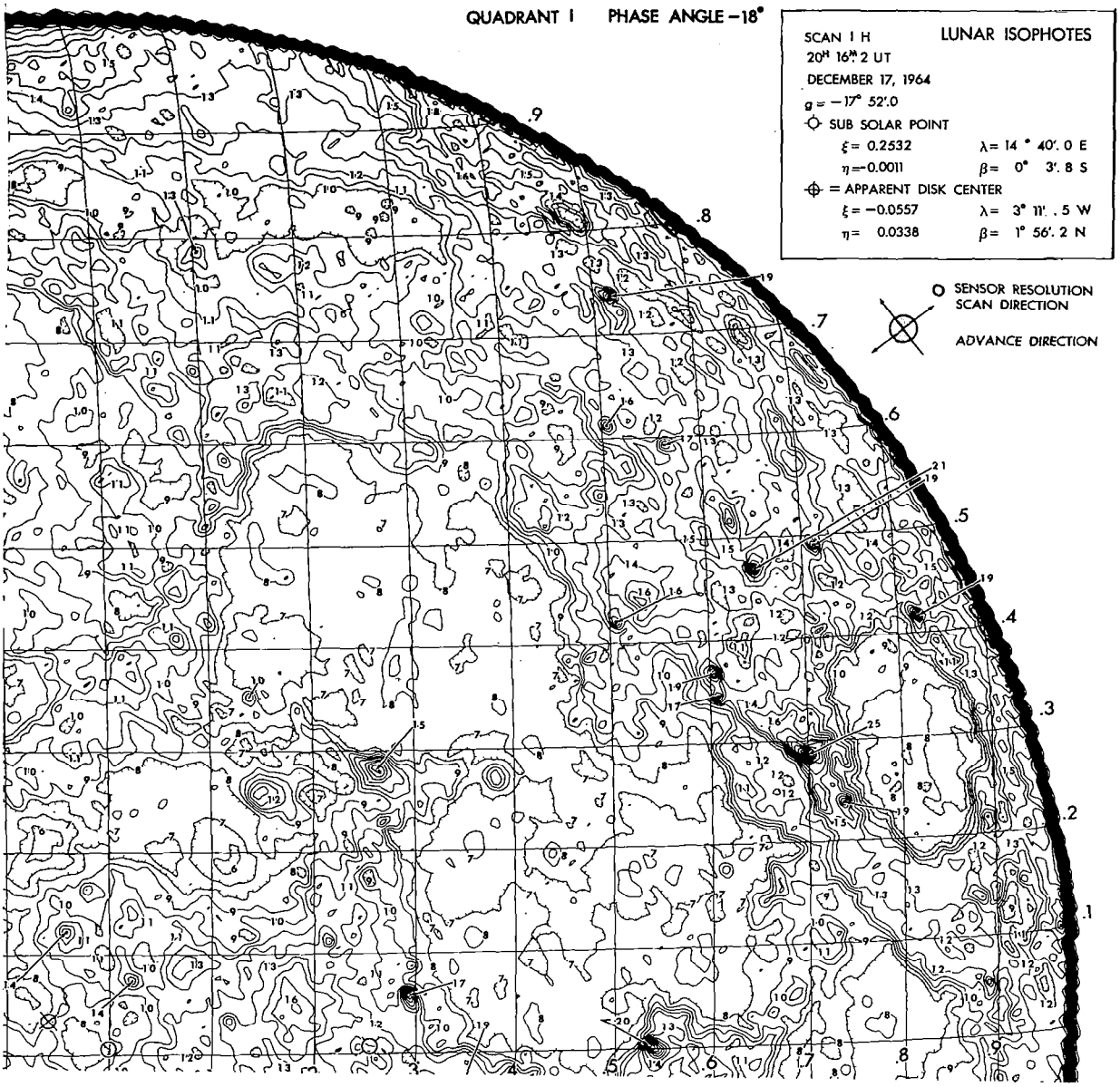
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	.61	33	20.05	65	39.50	97	58.94
3	1.82	35	21.27	67	40.71	99	60.16
5	3.04	37	22.48	69	41.23	101	61.37
7	4.25	39	23.70	71	43.14	103	62.59
9	5.47	41	24.91	73	44.36	105	63.80
11	6.68	43	26.13	75	45.57	107	65.02
13	7.90	45	27.34	77	46.79		
15	9.11	47	28.56	79	48.00		
17	10.33	49	29.77	81	49.22		
19	11.55	51	30.99	83	50.43		
21	12.76	53	32.21	85	51.65		
23	13.98	55	33:42	87	52.87		
25	15.19	57	34.64	89	54.08		
27	16.41	59	35.85	91	55.30		
29	17.62	61	37.07	93	56.51		
31	18.84	63	38.28	95	57.73		



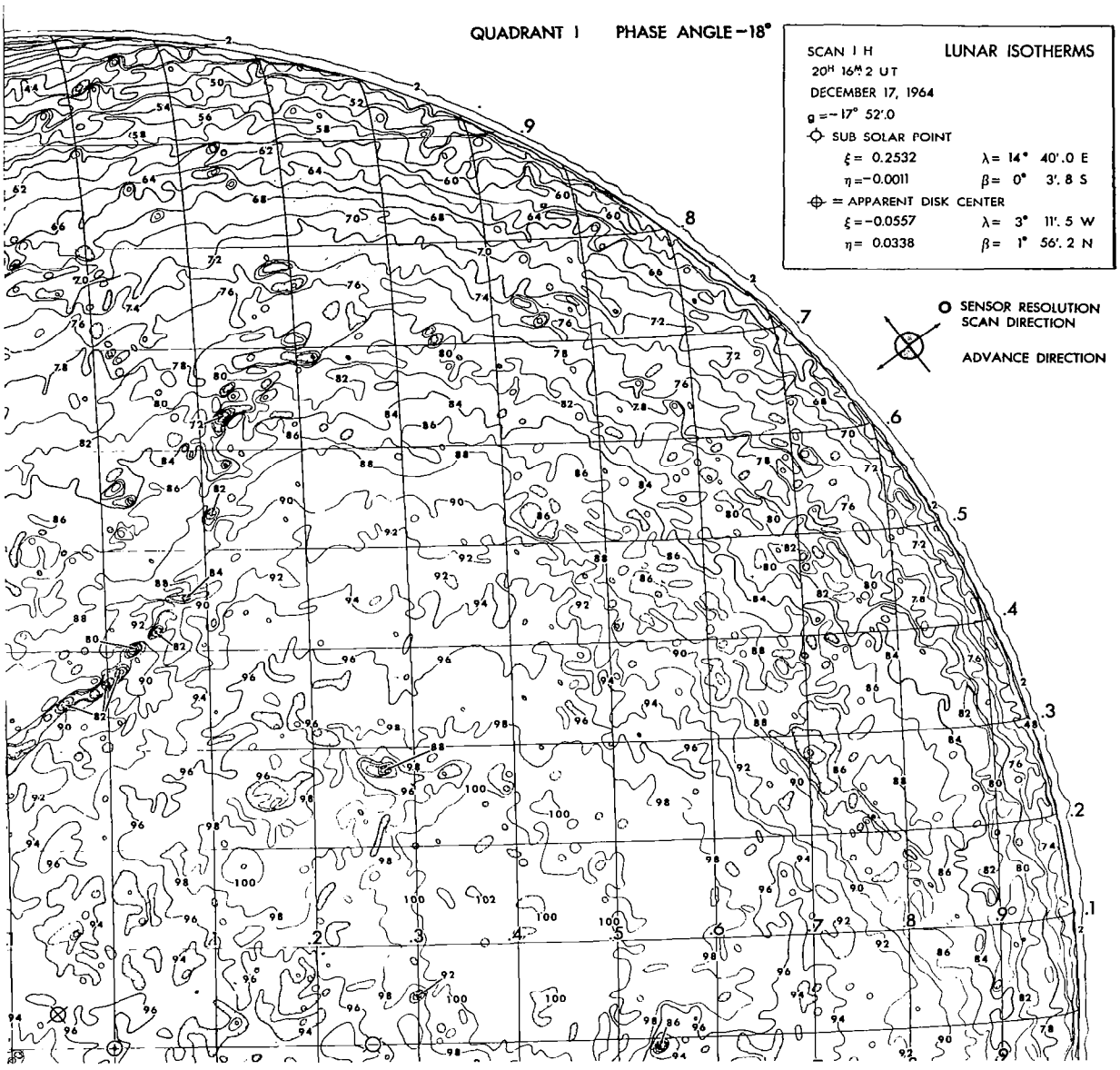
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
1	164.1	33	290.9	65	341.5	97	380.0
3	190.2	35	294.7	67	344.1	99	382.2
5	205.4	37	298.4	69	346.7	101	384.4
7	216.8	39	302.0	71	349.3	103	386.5
9	226.2	41	305.5	73	351.9	105	388.6
11	234.2	43	308.8	75	354.4	107	390.8
13	241.4	45	312.1	77	356.8	109	392.9
15	247.9	47	315.3	79	359.3	111	394.9
17	253.9	49	318.5	81	361.7	113	397.0
19	259.4	51	321.5	83	364.1	115	399.0
21	264.6	53	324.5	85	366.4		
23	269.5	55	327.5	87	368.8		
25	274.2	57	330.4	89	371.1		
27	278.6	59	333.2	91	373.3		
29	282.9	61	336.0	93	375.6		
31	287.0	63	338.8	95	377.8		



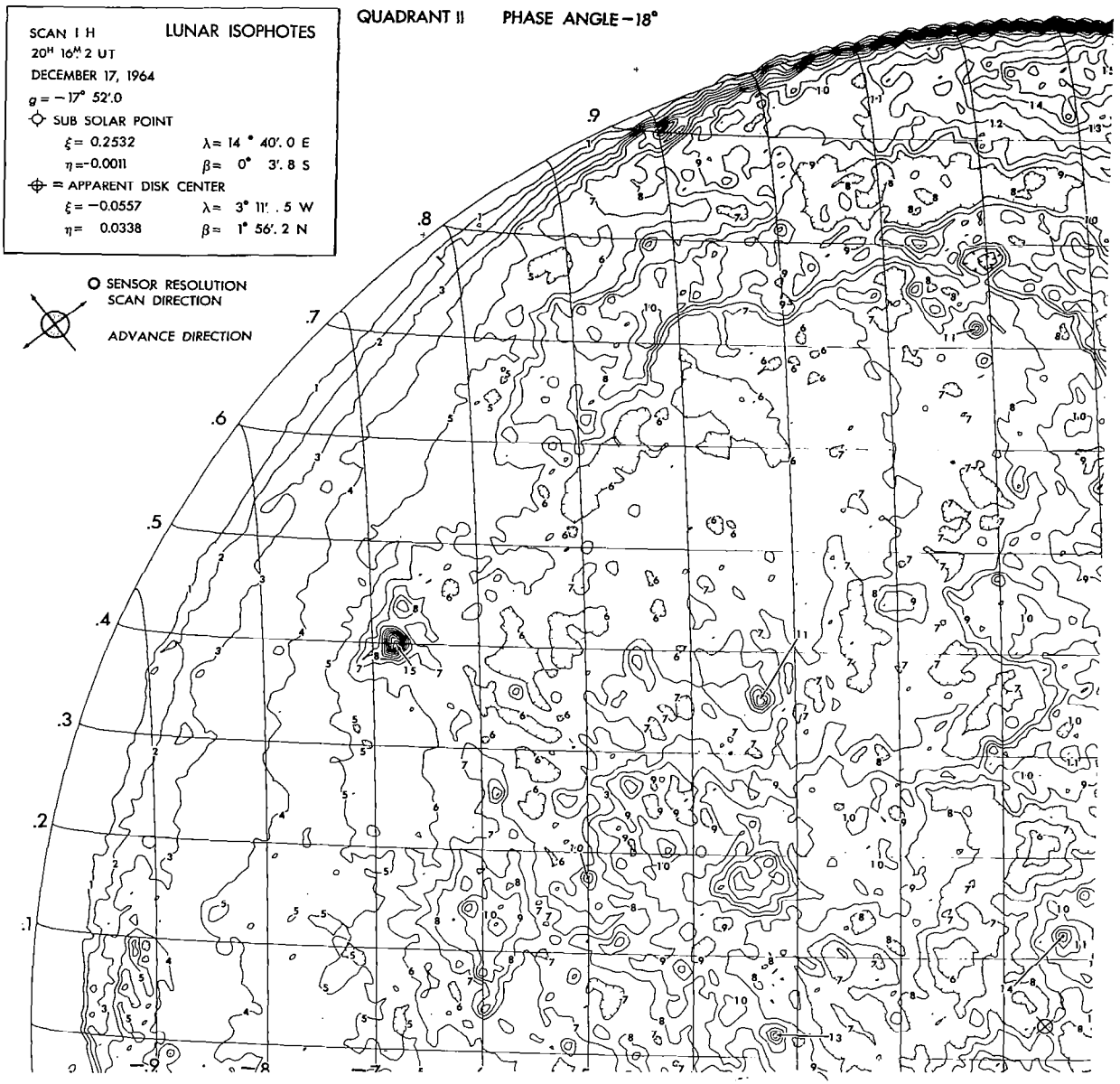
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	3.61	17	61.37
2	7.22	18	64.98
3	10.83	19	68.59
4	14.44	20	72.20
5	18.05	21	75.81
6	21.66	22	79.42
7	25.27	23	83.03
8	28.88	24	86.64
9	32.49	25	90.25
10	36.10	26	93.86
11	39.71	27	97.47
12	43.32	28	101.08
13	46.93	29	104.69
14	50.54	30	108.30
15	54.15		
16	57.76		



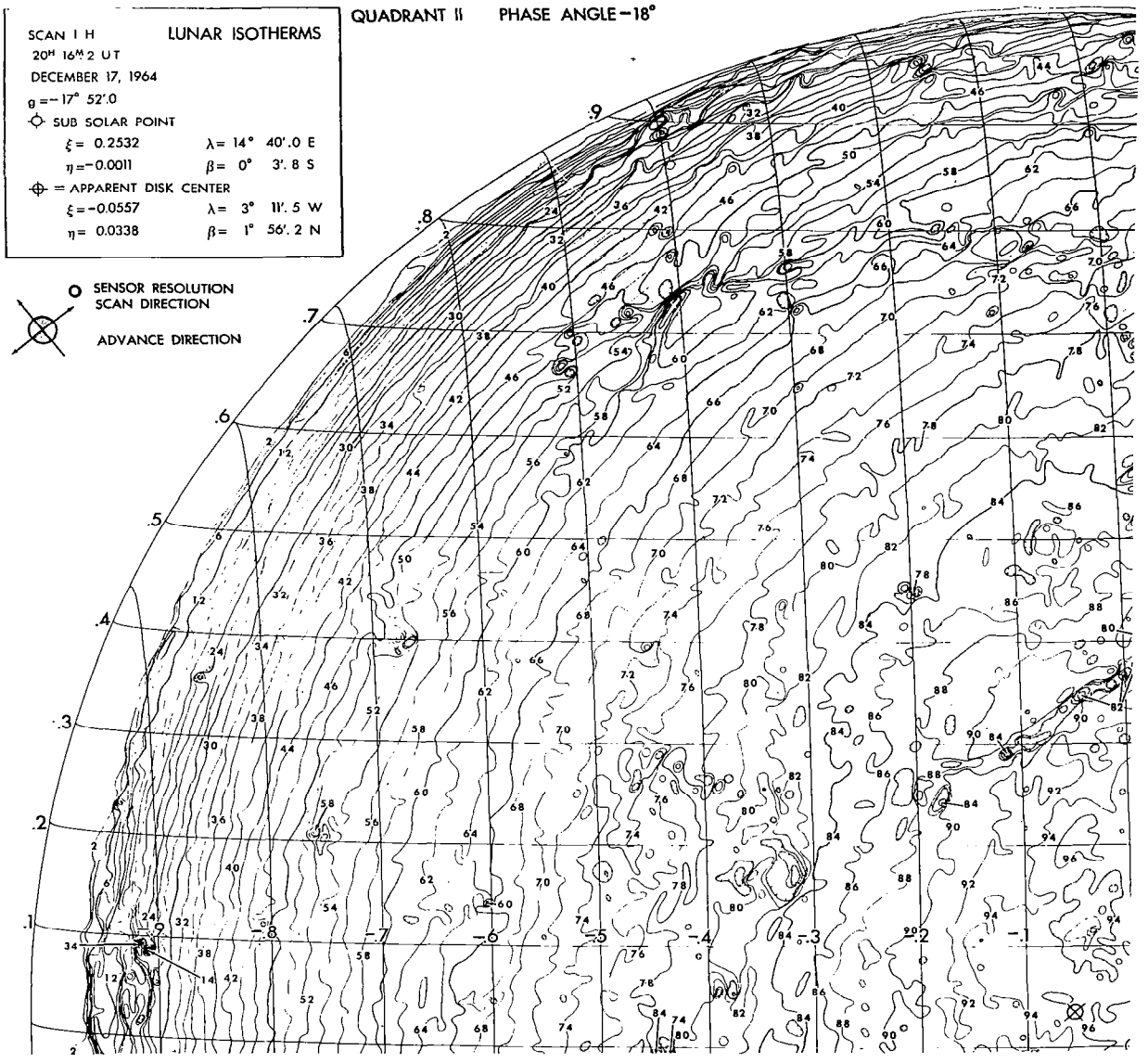
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.7	34	300.8	66	353.6	98	394.3
4	202.2	36	304.7	68	356.4		
6	215.6	38	308.6	70	359.1		
8	226.3	40	312.3	72	361.8		
10	235.3	42	315.9	74	364.5		
12	243.2	44	319.4	76	367.1		
14	250.4	46	322.8	78	369.8		
16	256.9	48	326.2	80	372.3		
18	262.9	50	329.5	82	374.9		
20	268.5	52	332.7	84	377.4		
22	273.8	54	335.8	86	379.9		
24	278.8	56	338.9	88	382.3		
26	283.6	58	341.9	90	384.8		
28	288.1	60	344.9	92	387.2		
30	292.5	62	347.8	94	389.6		
32	296.7	64	350.7	96	391.9		



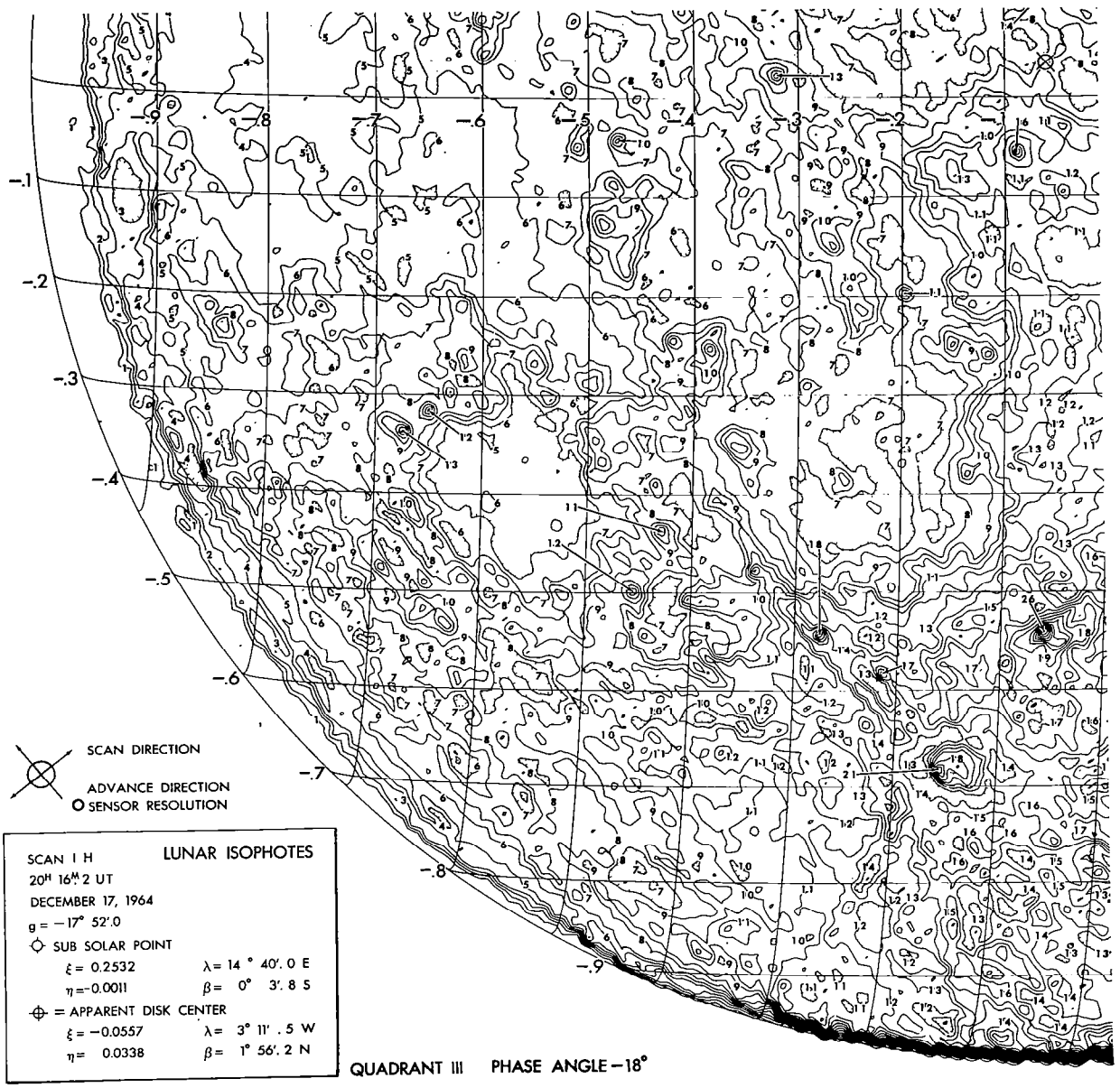
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	3.61	17	61.37
2	7.22	18	64.98
3	10.83	19	68.59
4	14.44	20	72.20
5	18.05	21	75.81
6	21.66	22	79.42
7	25.27	23	83.03
8	28.88	24	86.64
9	32.49	25	90.25
10	36.10	26	93.86
11	39.71	27	97.47
12	43.32	28	101.08
13	46.93	29	104.69
14	50.54	30	108.30
15	54.15		
16	57.76		



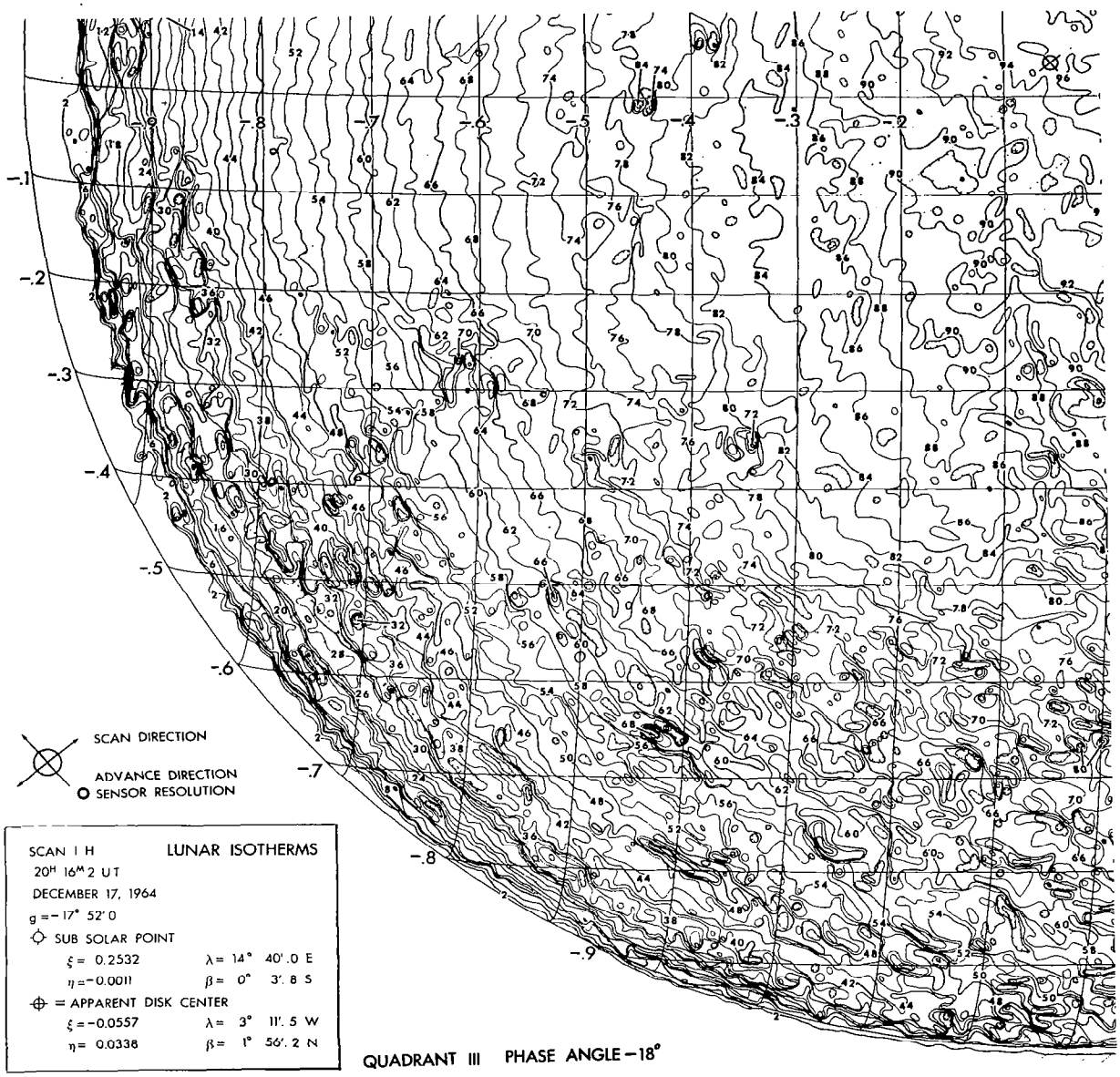
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.7	34	300.8	66	353.6	98	394.3
4	202.2	36	304.7	68	356.4		
6	215.6	38	308.6	70	359.1		
8	226.3	40	312.3	72	361.8		
10	235.3	42	315.9	74	364.5		
12	243.2	44	319.4	76	367.1		
14	250.4	46	322.8	78	369.8		
16	256.9	48	326.2	80	372.3		
18	262.9	50	329.5	82	374.9		
20	268.5	52	332.7	84	377.4		
22	273.8	54	335.8	86	379.9		
24	278.8	56	338.9	88	382.3		
26	283.6	58	341.9	90	384.8		
28	288.1	60	344.9	92	387.2		
30	292.5	62	347.8	94	389.6		
32	296.7	64	350.7	96	391.9		



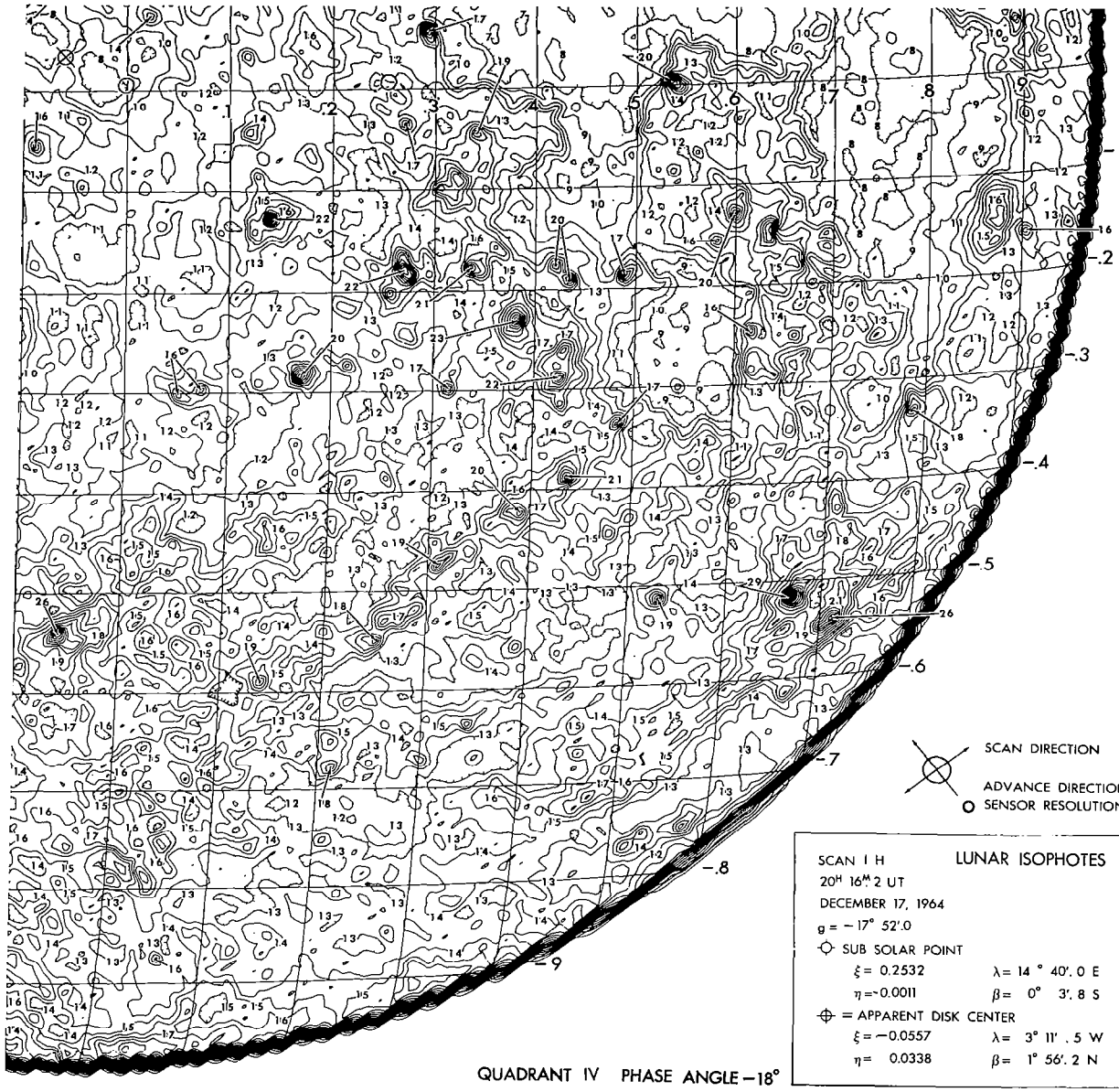
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	3.61	17	61.37
2	7.22	18	64.98
3	10.83	19	68.59
4	14.44	20	72.20
5	18.05	21	75.81
6	21.66	22	79.42
7	25.27	23	83.03
8	28.88	24	86.64
9	32.49	25	90.25
10	36.10	26	93.86
11	39.71	27	97.47
12	43.32	28	101.08
13	46.93	29	104.69
14	50.54	30	108.30
15	54.15		
16	57.76		



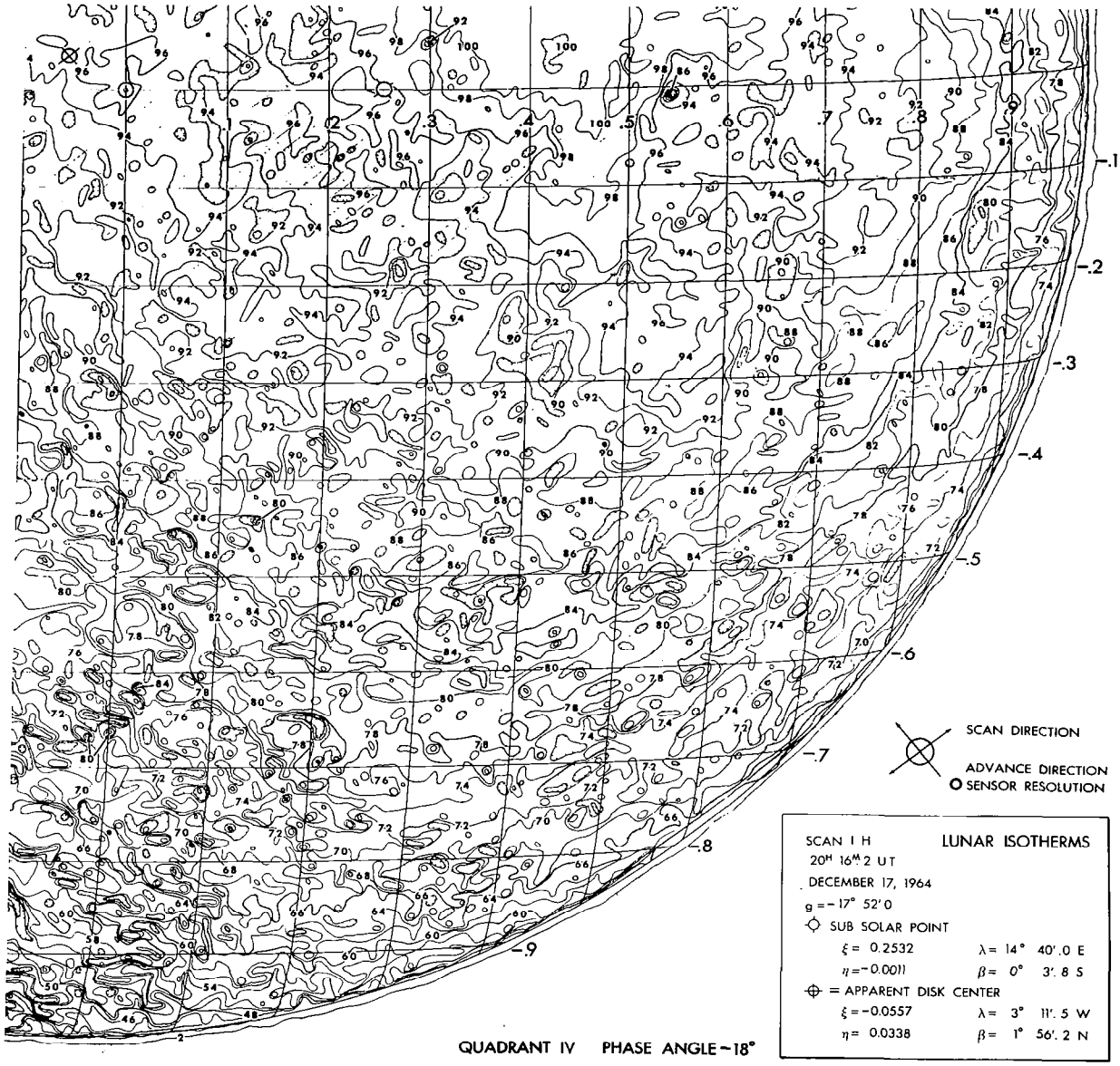
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.7	34	300.8	66	353.6	98	394.3
4	202.2	36	304.7	68	356.4		
6	215.6	38	308.6	70	359.1		
8	226.3	40	312.3	72	361.8		
10	235.3	42	315.9	74	364.5		
12	243.2	44	319.4	76	367.1		
14	250.4	46	322.8	78	369.8		
16	256.9	48	326.2	80	372.3		
18	262.9	50	329.5	82	374.9		
20	268.5	52	332.7	84	377.4		
22	273.8	54	335.8	86	379.9		
24	278.8	56	338.9	88	382.3		
26	283.6	58	341.9	90	384.8		
28	288.1	60	344.9	92	387.2		
30	292.5	62	347.8	94	389.6		
32	296.7	64	350.7	96	391.9		



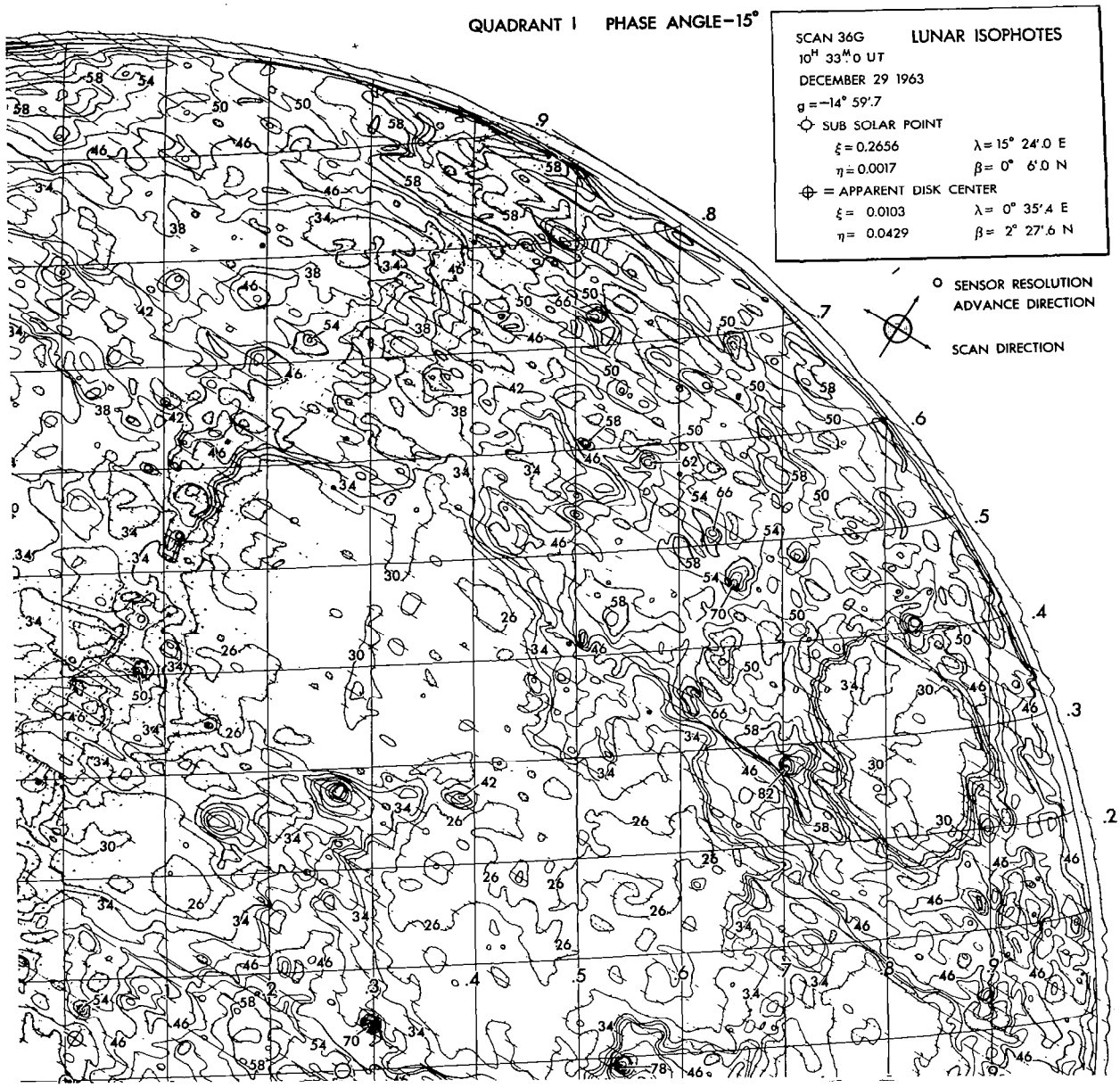
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
1	3.61	17	61.37
2	7.22	18	64.98
3	10.83	19	68.59
4	14.44	20	72.20
5	18.05	21	75.81
6	21.66	22	79.42
7	25.27	23	83.03
8	28.88	24	86.64
9	32.49	25	90.25
10	36.10	26	93.86
11	39.71	27	97.47
12	43.32	28	101.08
13	46.93	29	104.69
14	50.54	30	108.30
15	54.15		
16	57.76		



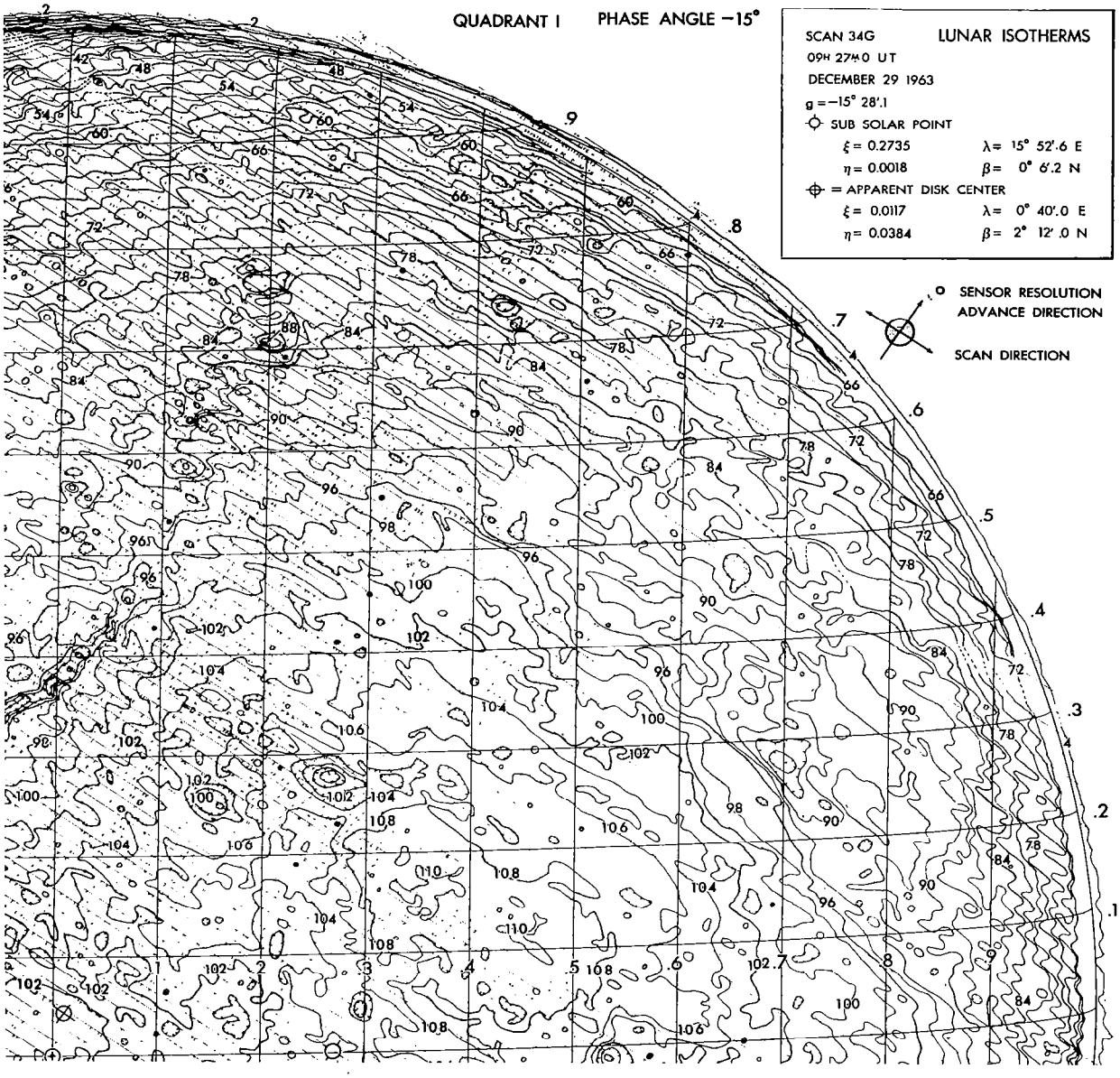
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.7	34	300.8	66	353.6	98	394.3
4	202.2	36	304.7	68	356.4		
6	215.6	38	308.6	70	359.1		
8	226.3	40	312.3	72	361.8		
10	235.3	42	315.9	74	364.5		
12	243.2	44	319.4	76	367.1		
14	250.4	46	322.8	78	369.8		
16	256.9	48	326.2	80	372.3		
18	262.9	50	329.5	82	374.9		
20	268.5	52	332.7	84	377.4		
22	273.8	54	335.8	86	379.9		
24	278.8	56	338.9	88	382.3		
26	283.6	58	341.9	90	384.8		
28	288.1	60	344.9	92	387.2		
30	292.5	62	347.8	94	389.6		
32	296.7	64	350.7	96	391.9		



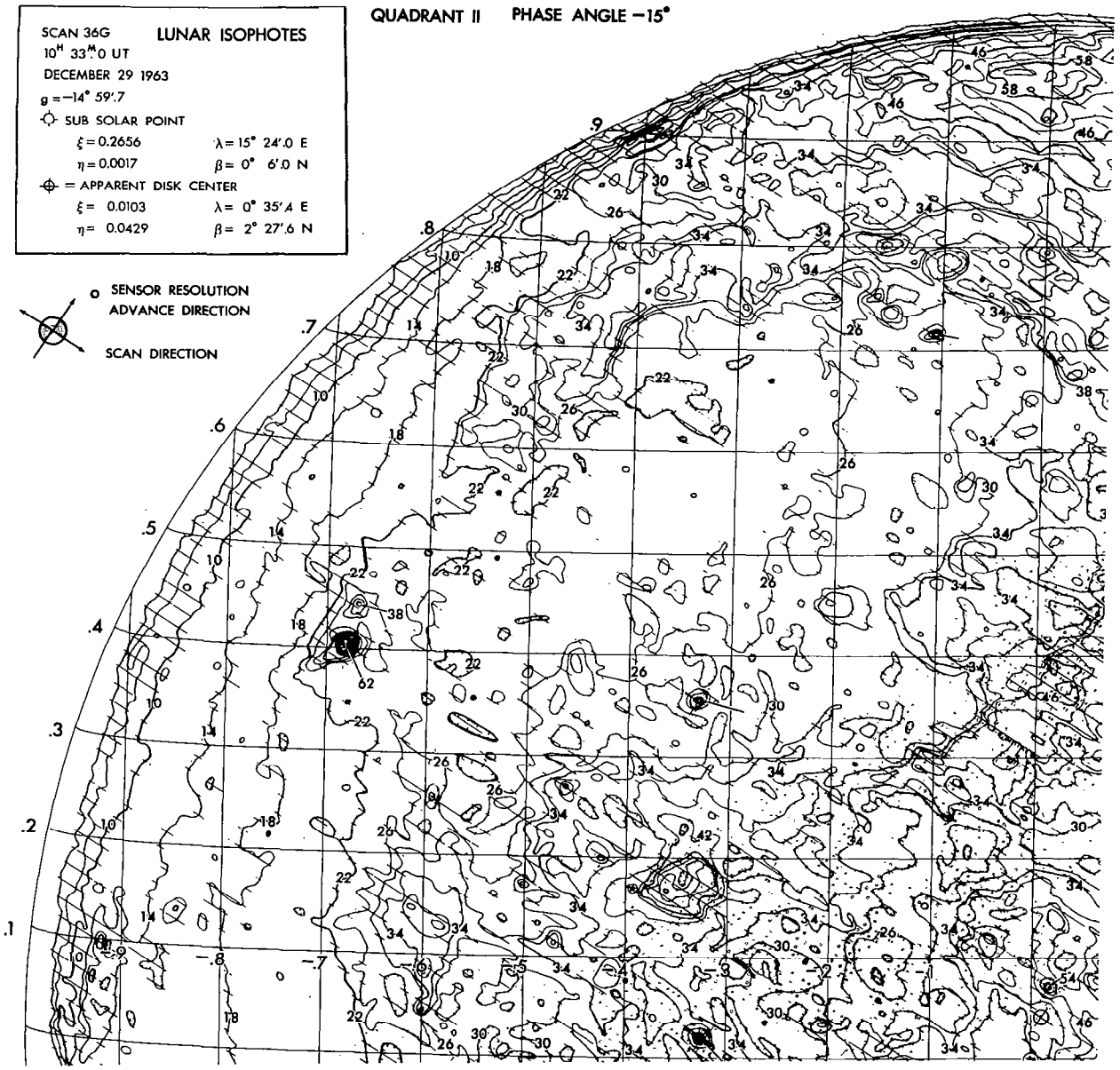
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.24	58	55.56
.75	.72	62	59.39
2	1.92	66	63.23
6	5.75	70	67.06
10	9.58	74	70.89
14	13.41	78	74.72
18	17.24	82	78.55
22	21.08	86	82.38
26	24.91	90	86.22
30	28.74	94	90.05
34	32.57	98	93.88
38	36.40	102	97.71
42	40.23	106	101.54
46	44.07	110	105.38
50	47.90	114	109.21
54	51.73		



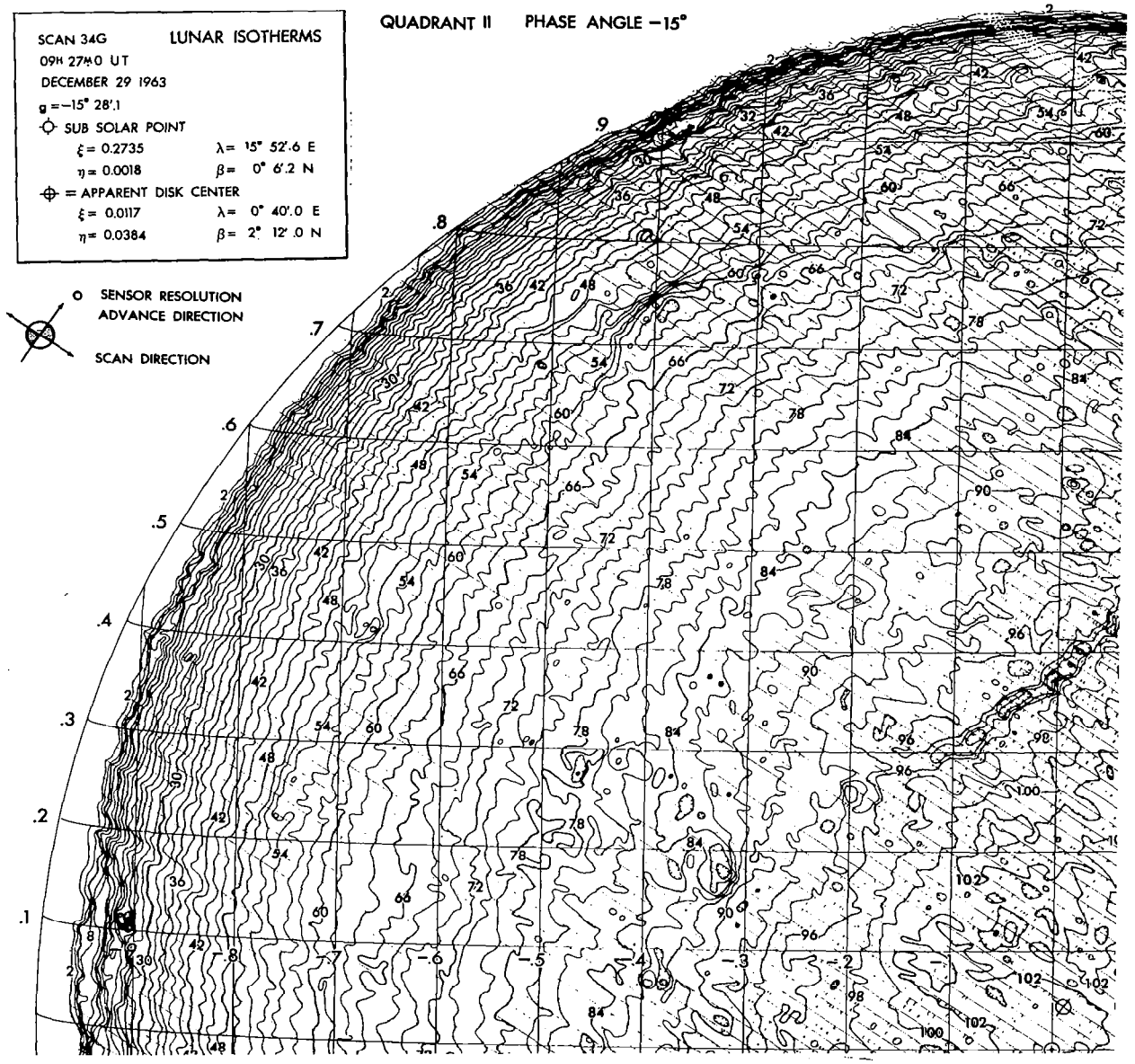
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	180.7	34	295.5	66	346.3	98	385.4
4	199.8	36	299.3	68	349.0	100	387.6
6	212.9	38	303.0	70	351.7	102	389.8
8	223.3	40	306.6	72	354.3	104	392.0
10	232.0	42	310.1	74	356.9	106	394.2
12	239.7	44	313.5	76	359.4	108	396.3
14	246.7	46	316.8	78	361.9	110	398.5
16	253.0	48	320.0	80	364.4	112	400.6
18	258.8	50	323.2	82	366.8		
20	264.3	52	326.2	84	369.2		
22	269.4	54	329.3	86	371.6		
24	274.2	56	332.3	88	374.0		
26	278.9	58	335.2	90	376.3		
28	283.3	60	338.0	92	378.6		
30	287.5	62	340.9	94	380.9		
32	291.6	64	343.6	96	383.2		



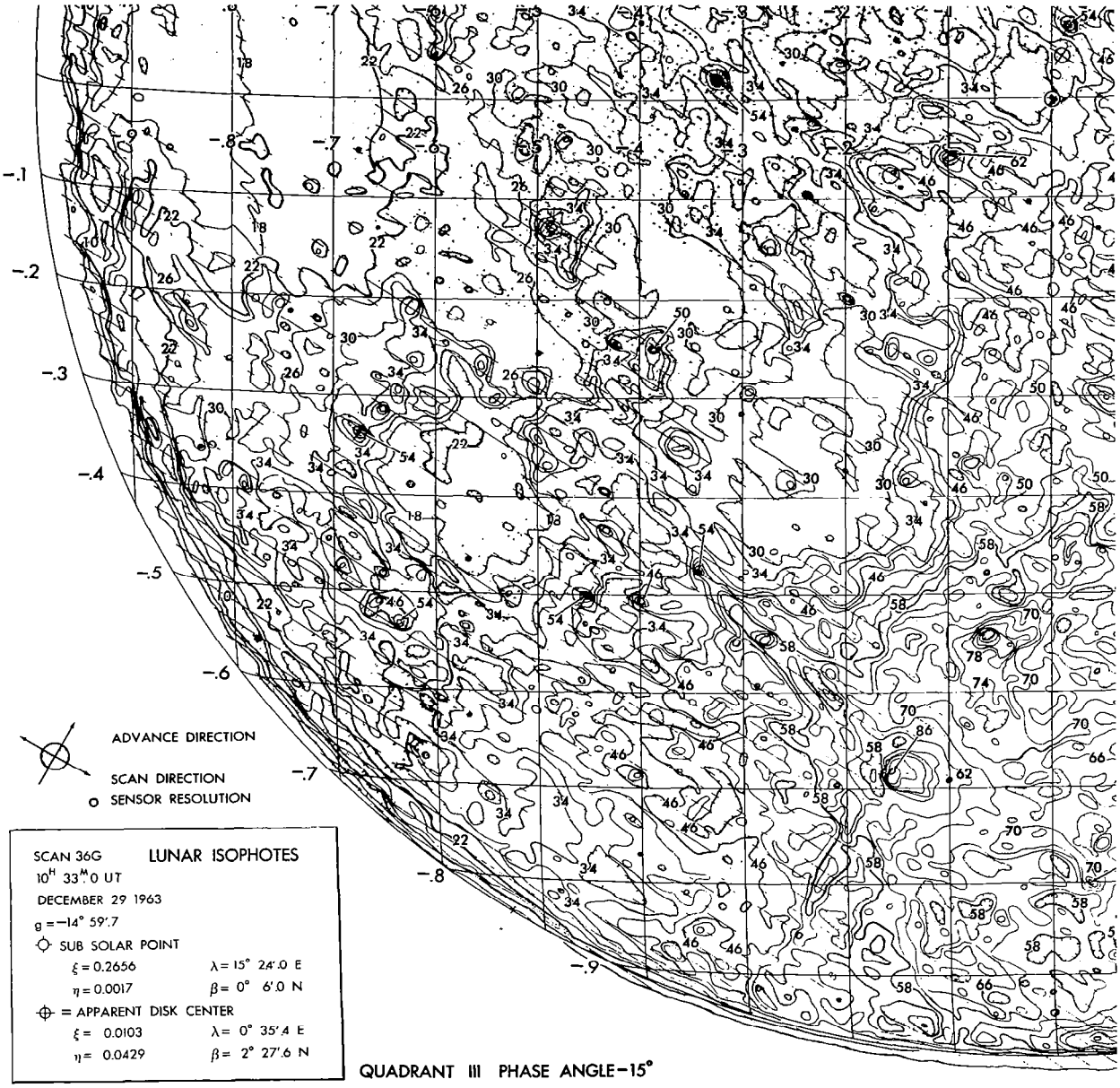
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.24	58	55.56
.75	.72	62	59.39
2	1.92	66	63.23
6	5.75	70	67.06
10	9.58	74	70.89
14	13.41	78	74.72
18	17.24	82	78.55
22	21.08	86	82.38
26	24.91	90	86.22
30	28.74	94	90.05
34	32.57	98	93.88
38	36.40	102	97.71
42	40.23	106	101.54
46	44.07	110	105.38
50	47.90	114	109.21
54	51.73		



THERMAL CALIBRATION DATA

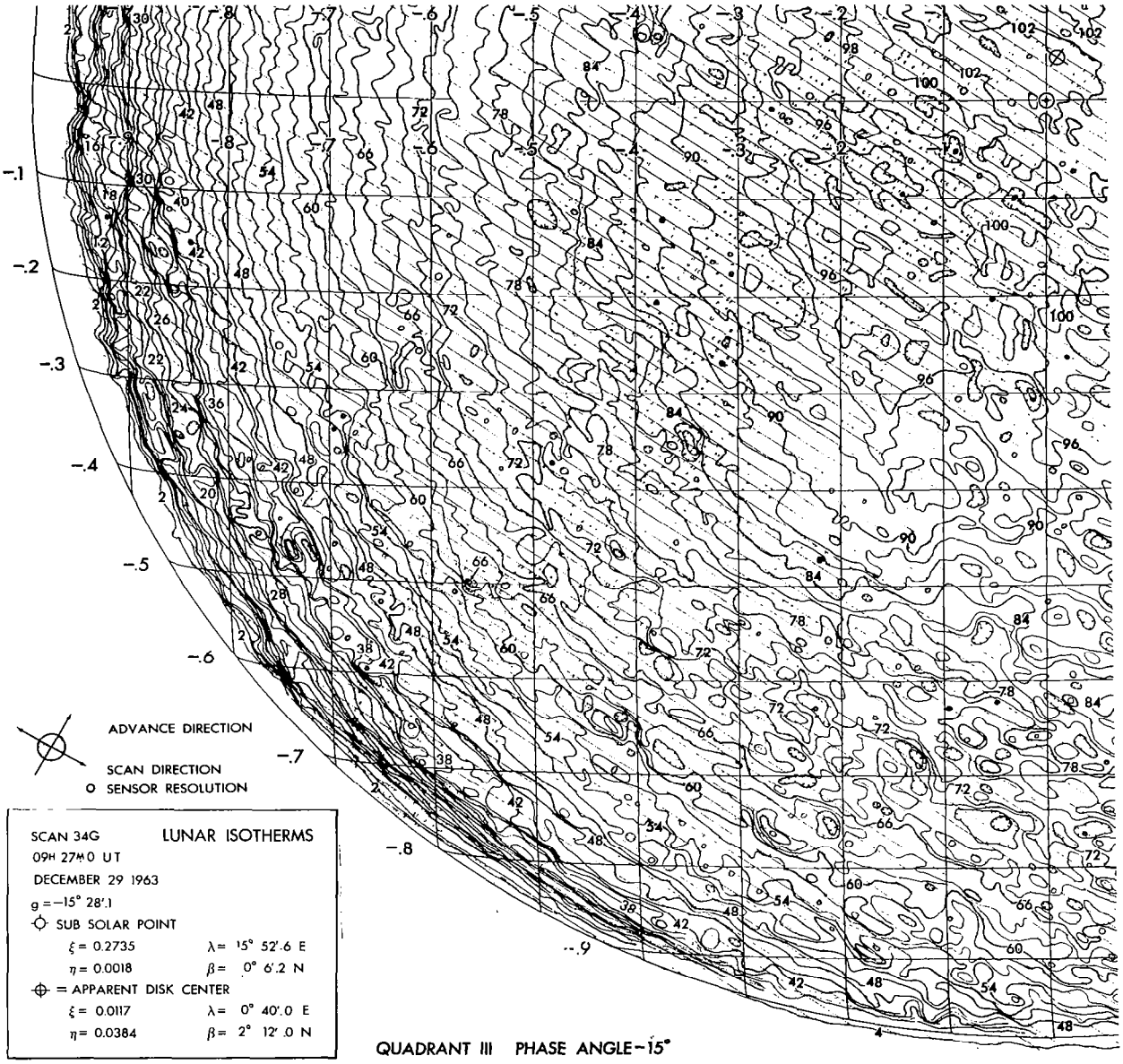
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	180.7	34	295.5	66	346.3	98	385.4
4	199.8	36	299.3	68	349.0	100	387.6
6	212.9	38	303.0	70	351.7	102	389.8
8	223.3	40	306.6	72	354.3	104	392.0
10	232.0	42	310.1	74	356.9	106	394.2
12	239.7	44	313.5	76	359.4	108	396.3
14	246.7	46	316.8	78	361.9	110	398.5
16	253.0	48	320.0	80	364.4	112	400.6
18	258.8	50	323.2	82	366.8		
20	264.3	52	326.2	84	369.2		
22	269.4	54	329.3	86	371.6		
24	274.2	56	332.3	88	374.0		
26	278.9	58	335.2	90	376.3		
28	283.3	60	338.0	92	378.6		
30	287.5	62	340.9	94	380.9		
32	291.6	64	343.6	96	383.2		



QUADRANT III PHASE ANGLE −15°

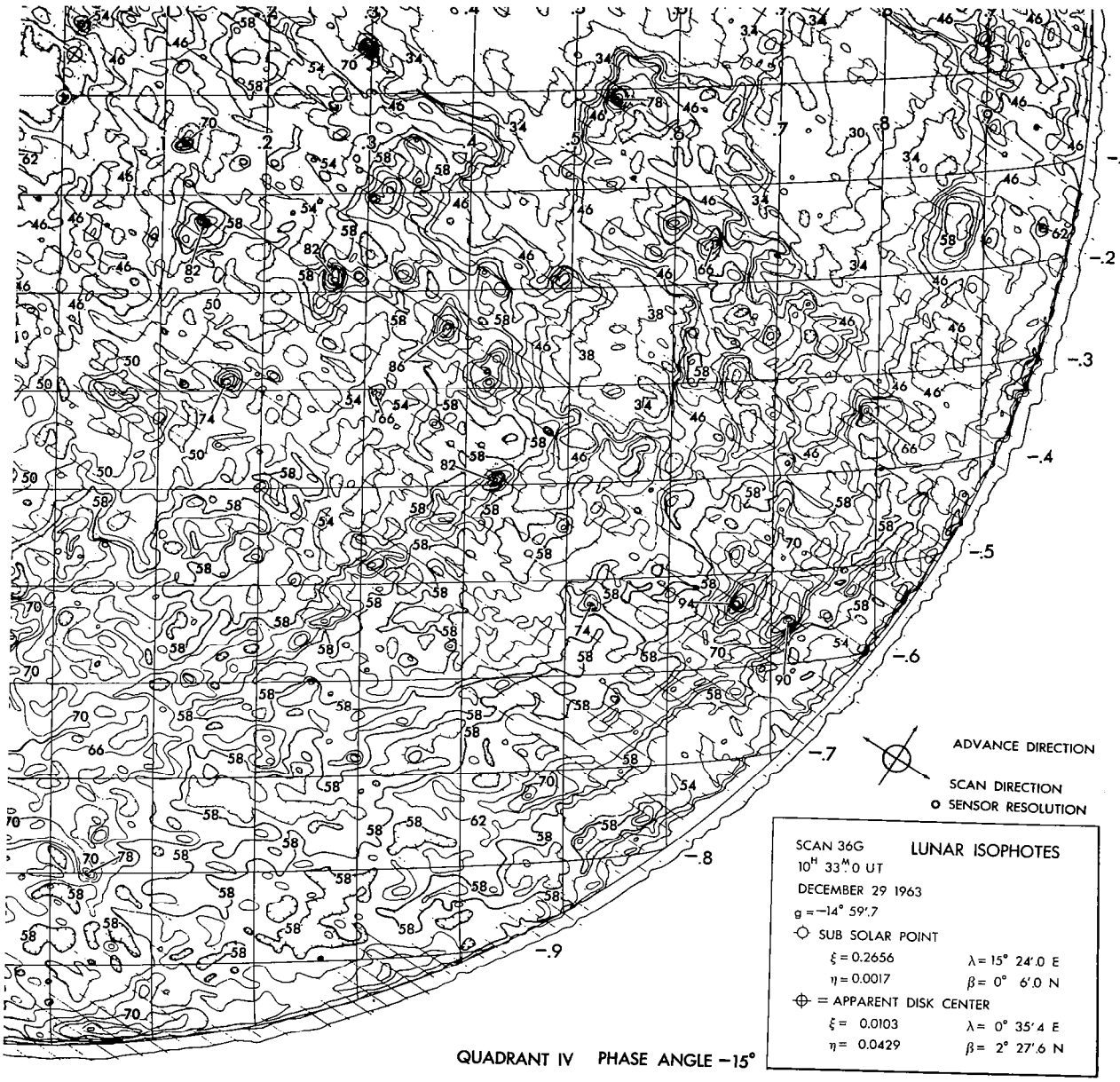
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.24	58	55.56
.75	.72	62	59.39
2	1.92	66	63.23
6	5.75	70	67.06
10	9.58	74	70.89
14	13.41	78	74.72
18	17.24	82	78.55
22	21.08	86	82.38
26	24.91	90	86.22
30	28.74	94	90.05
34	32.57	98	93.88
38	36.40	102	97.71
42	40.23	106	101.54
46	44.07	110	105.38
50	47.90	114	109.21
54	51.73		



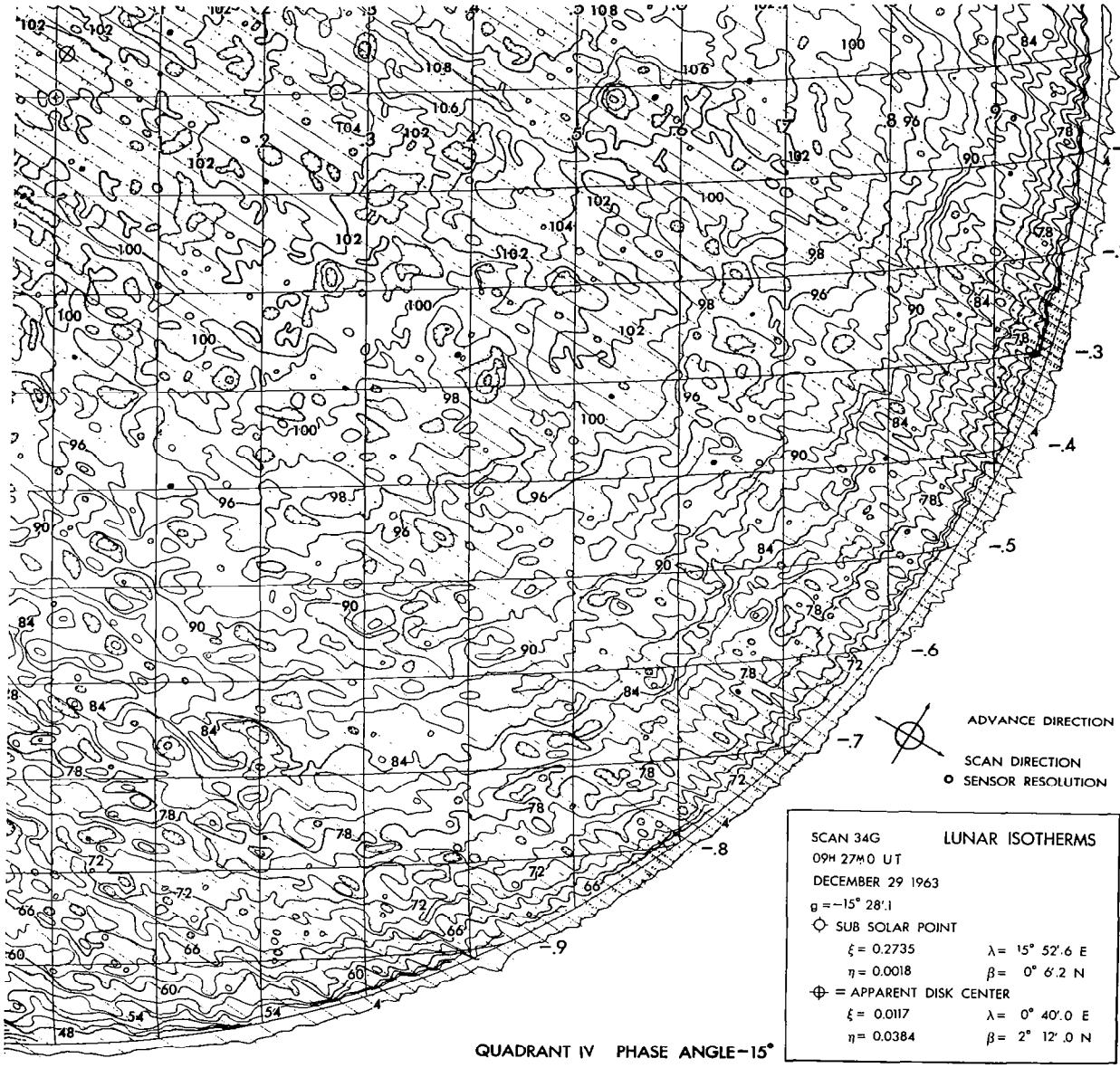
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	180.7	34	295.5	66	346.3	98	385.4
4	199.8	36	299.3	68	349.0	100	387.6
6	212.9	38	303.0	70	351.7	102	389.8
8	223.3	40	306.6	72	354.3	104	392.0
10	232.0	42	310.1	74	356.9	106	394.2
12	239.7	44	313.5	76	359.4	108	396.3
14	246.7	46	316.8	78	361.9	110	398.5
16	253.0	48	320.0	80	364.4	112	400.6
18	258.8	50	323.2	82	366.8		
20	264.3	52	326.2	84	369.2		
22	269.4	54	329.3	86	371.6		
24	274.2	56	332.3	88	374.0		
26	278.9	58	335.2	90	376.3		
28	283.3	60	338.0	92	378.6		
30	287.5	62	340.9	94	380.9		
32	291.6	64	343.6	96	383.2		



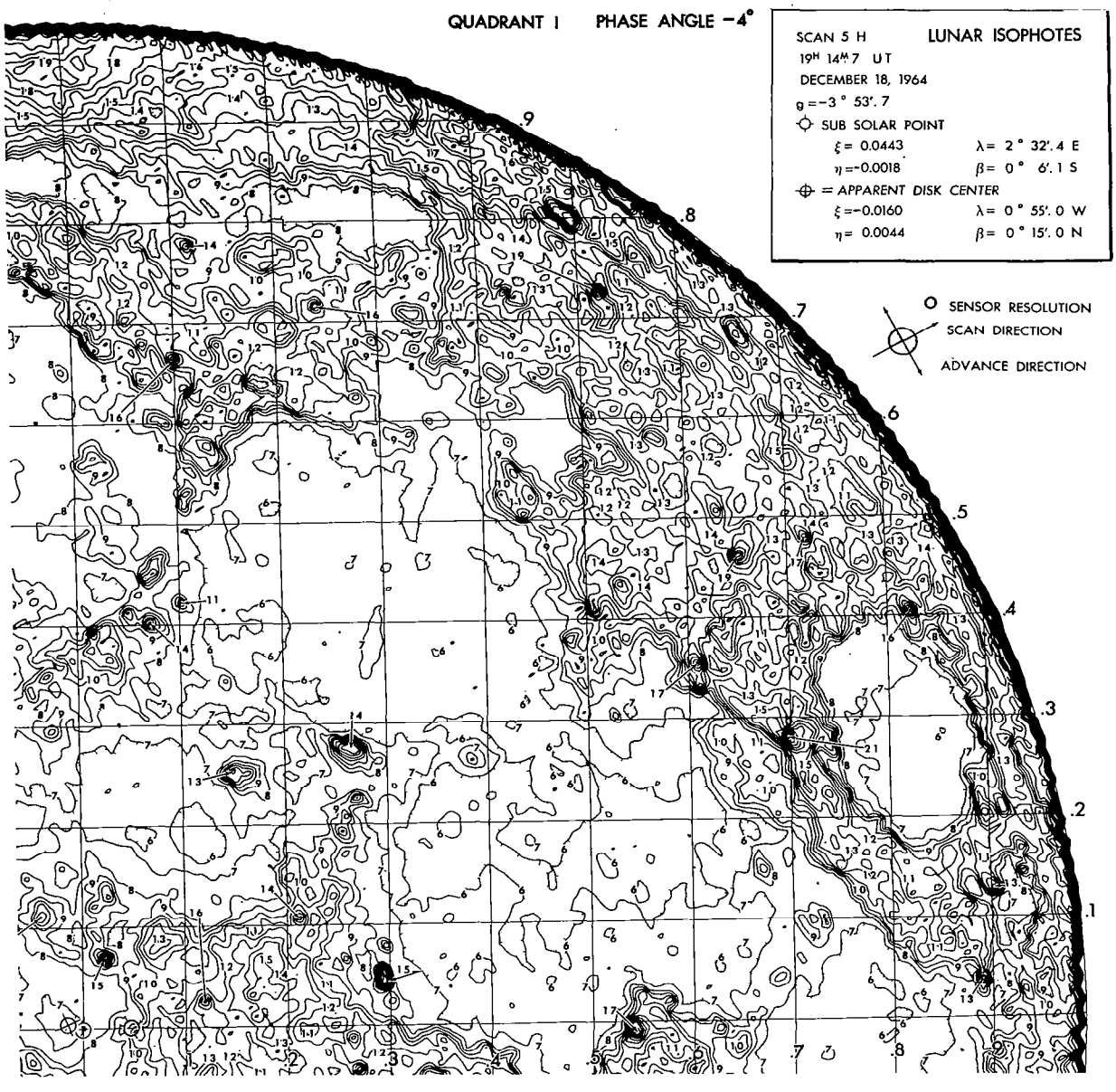
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.24	58	55.56
.75	.72	62	59.39
2	1.92	66	63.23
6	5.75	70	67.06
10	9.58	74	70.89
14	13.41	78	74.72
18	17.24	82	78.55
22	21.08	86	82.38
26	24.91	90	86.22
30	28.74	94	90.05
34	32.57	98	93.88
38	36.40	102	97.71
42	40.23	106	101.54
46	44.07	110	105.38
50	47.90	114	109.21
54	51.73		



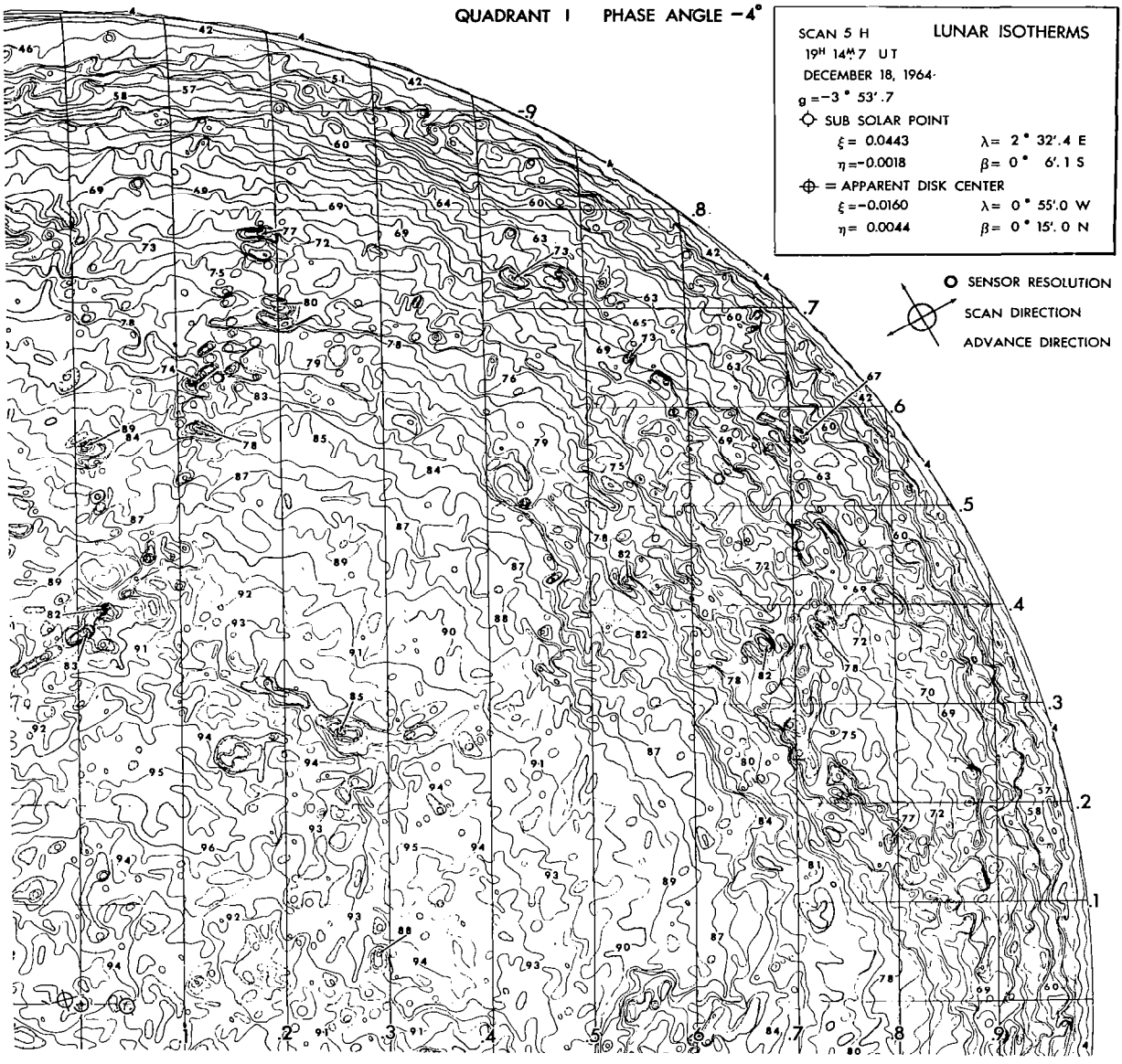
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	180.7	34	295.5	66	346.3	98	385.4
4	199.8	36	299.3	68	349.0	100	387.6
6	212.9	38	303.0	70	351.7	102	389.8
8	223.3	40	306.6	72	354.3	104	392.0
10	232.0	42	310.1	74	356.9	106	394.2
12	239.7	44	313.5	76	359.4	108	396.3
14	246.7	46	316.8	78	361.9	110	398.5
16	253.0	48	320.0	80	364.4	112	400.6
18	258.8	50	323.2	82	366.8		
20	264.3	52	326.2	84	369.2		
22	269.4	54	329.3	86	371.6		
24	274.2	56	332.3	88	374.0		
26	278.9	58	335.2	90	376.3		
28	283.3	60	338.0	92	378.6		
30	287.5	62	340.9	94	380.9		
32	291.6	64	343.6	96	383.2		



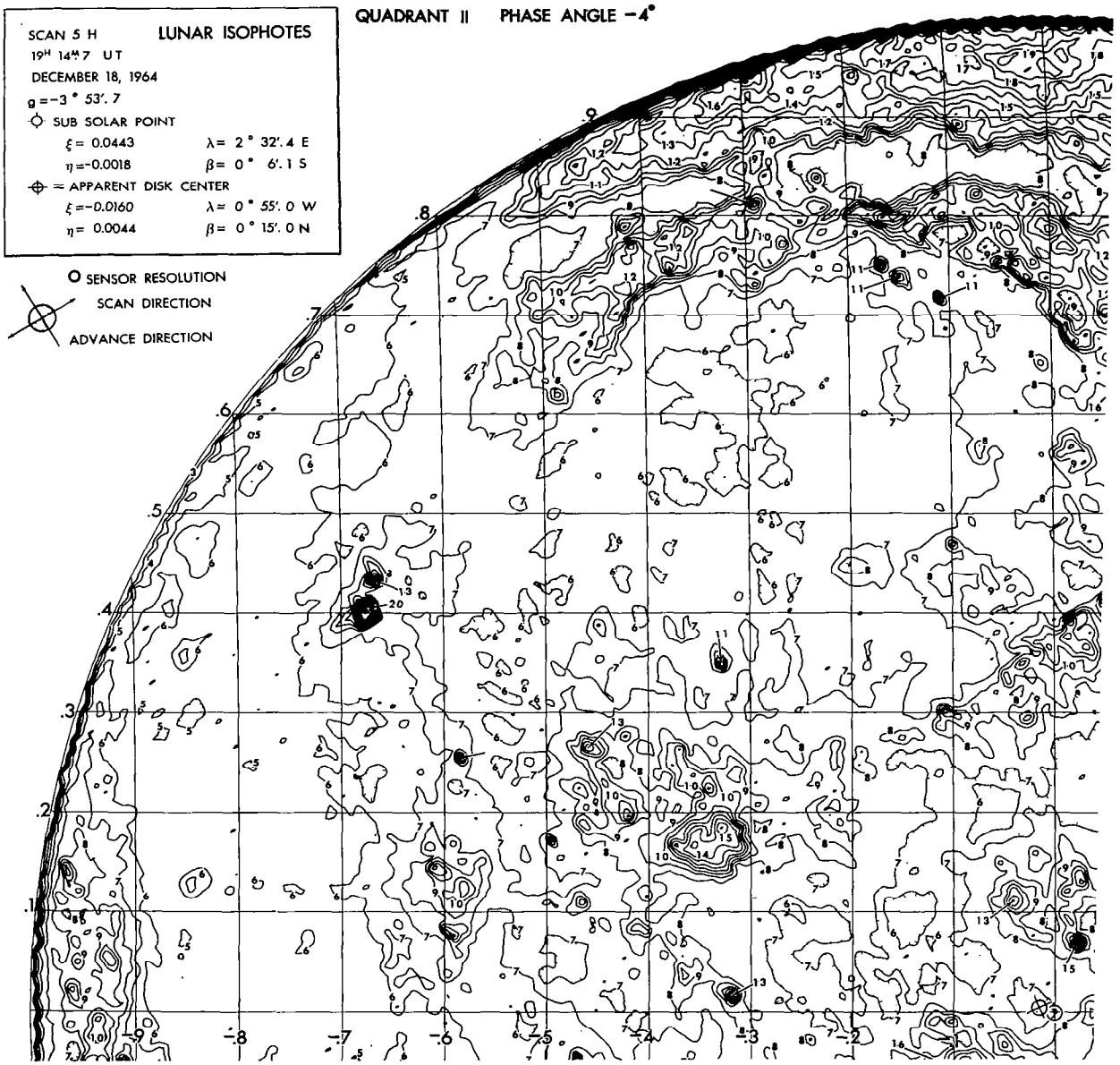
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
3	15.72	19	99.56
4	20.96	20	104.80
5	26.20	21	110.04
6	31.44	22	115.28
7	36.68	23	120.52
8	41.92	24	125.76
9	47.16	25	131.00
10	52.40		
11	57.64		
12	62.88		
13	68.12		
14	73.36		
15	78.60		
16	83.84		
17	89.08		
18	94.32		



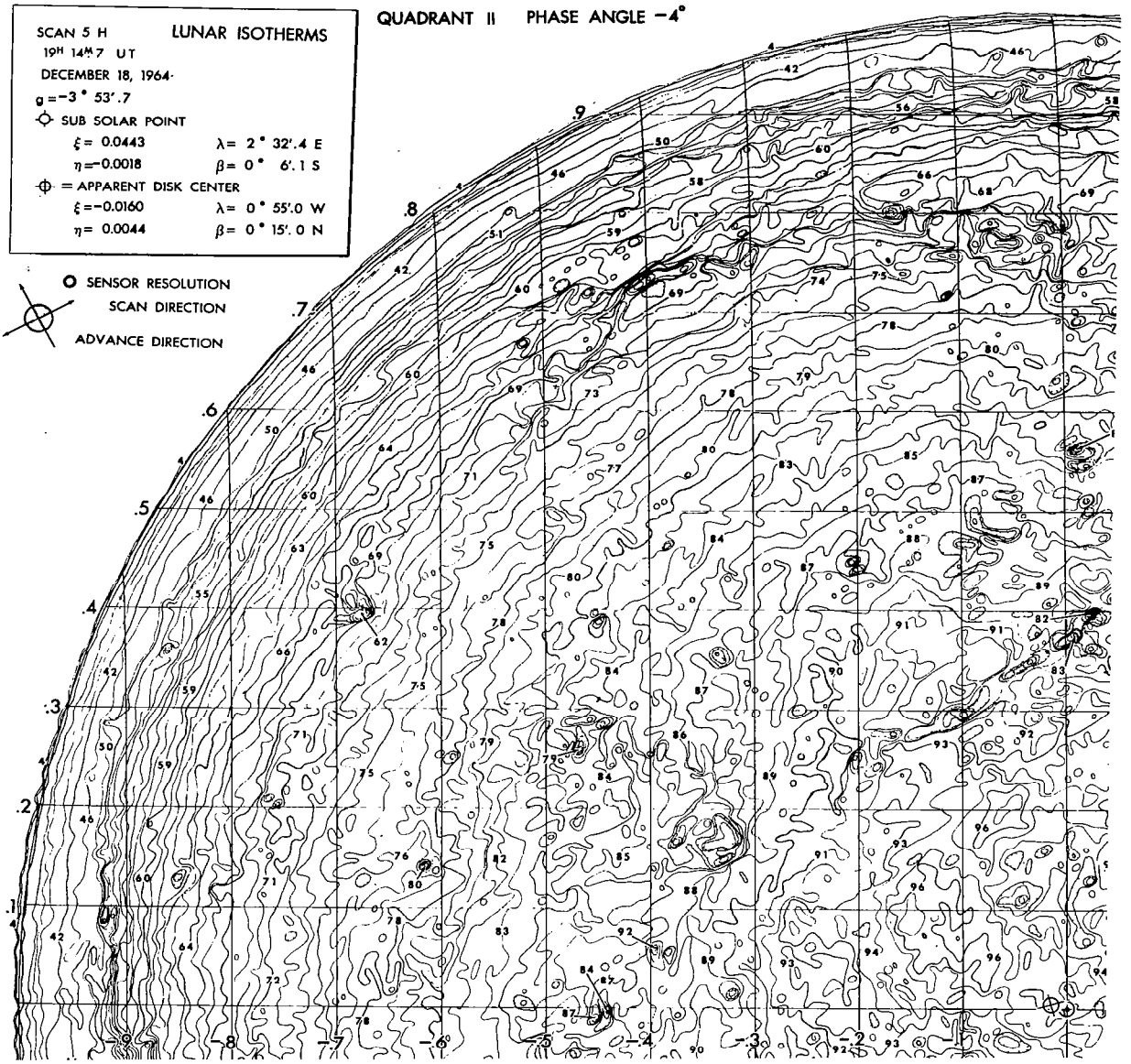
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
4	203.6	58	345.9	74	369.0	90	389.7
6	217.2	59	347.4	75	370.3	91	391.0
18	265.2	60	348.9	76	371.7	92	392.2
30	295.4	61	350.4	77	373.0	93	393.4
34	303.9	62	351.9	78	374.3	94	394.6
38	311.8	63	353.4	79	375.7	95	395.9
42	319.2	64	354.9	80	377.0	96	397.1
46	326.3	65	356.3	81	378.3	97	398.3
50	333.1	66	357.8	82	379.6		
51	334.8	67	359.2	83	380.9		
52	336.4	68	360.6	84	382.2		
53	338.0	69	362.0	85	383.4		
54	339.6	70	363.4	86	384.7		
55	341.2	71	364.8	87	386.0		
56	342.8	72	366.2	88	387.2		
57	344.3	73	367.6	89	388.5		



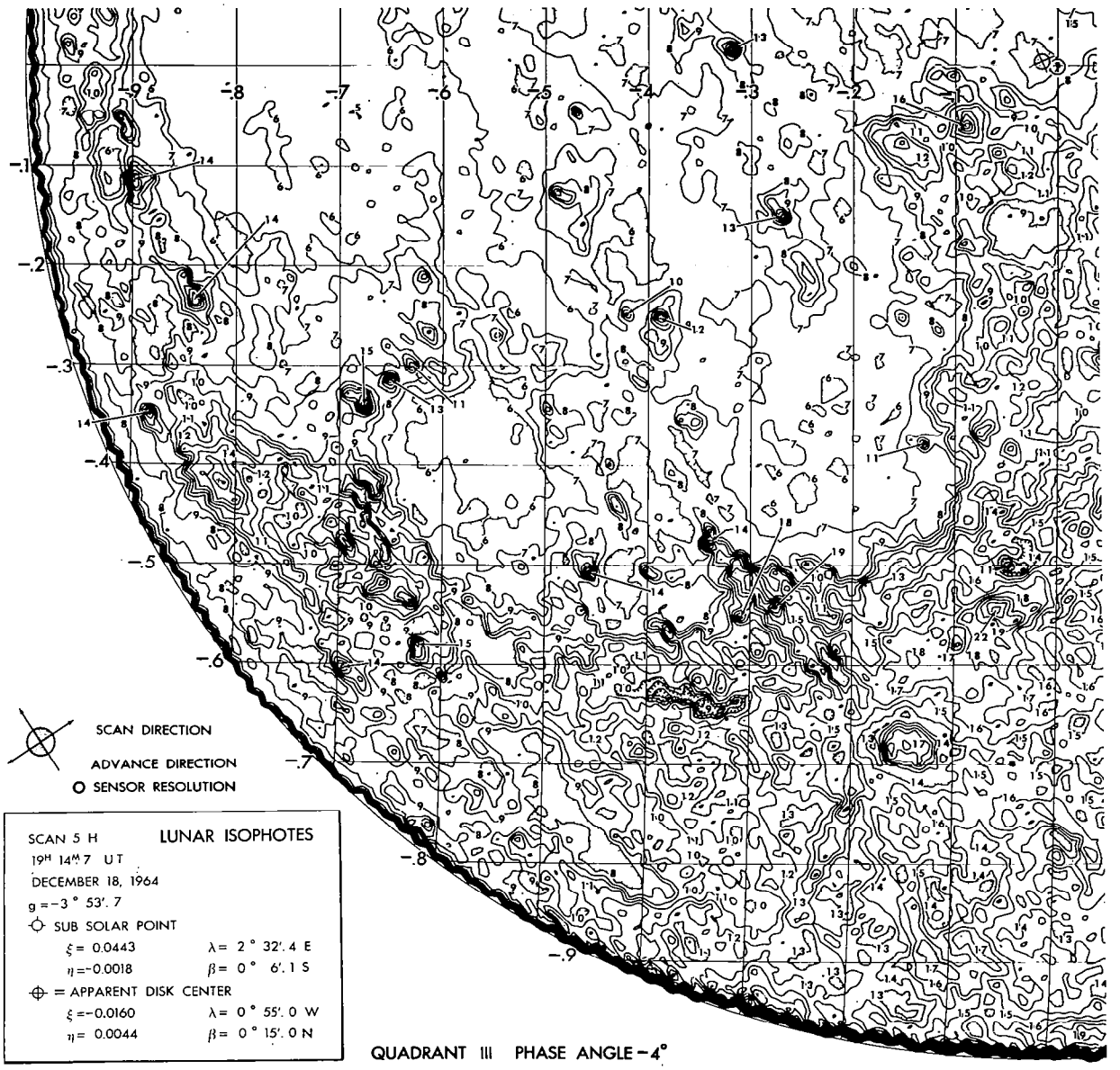
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
3	15.72	19	99.56
4	20.96	20	104.80
5	26.20	21	110.04
6	31.44	22	115.28
7	36.68	23	120.52
8	41.92	24	125.76
9	47.16	25	131.00
10	52.40		
11	57.64		
12	62.88		
13	68.12		
14	73.36		
15	78.60		
16	83.84		
17	89.08		
18	94.32		



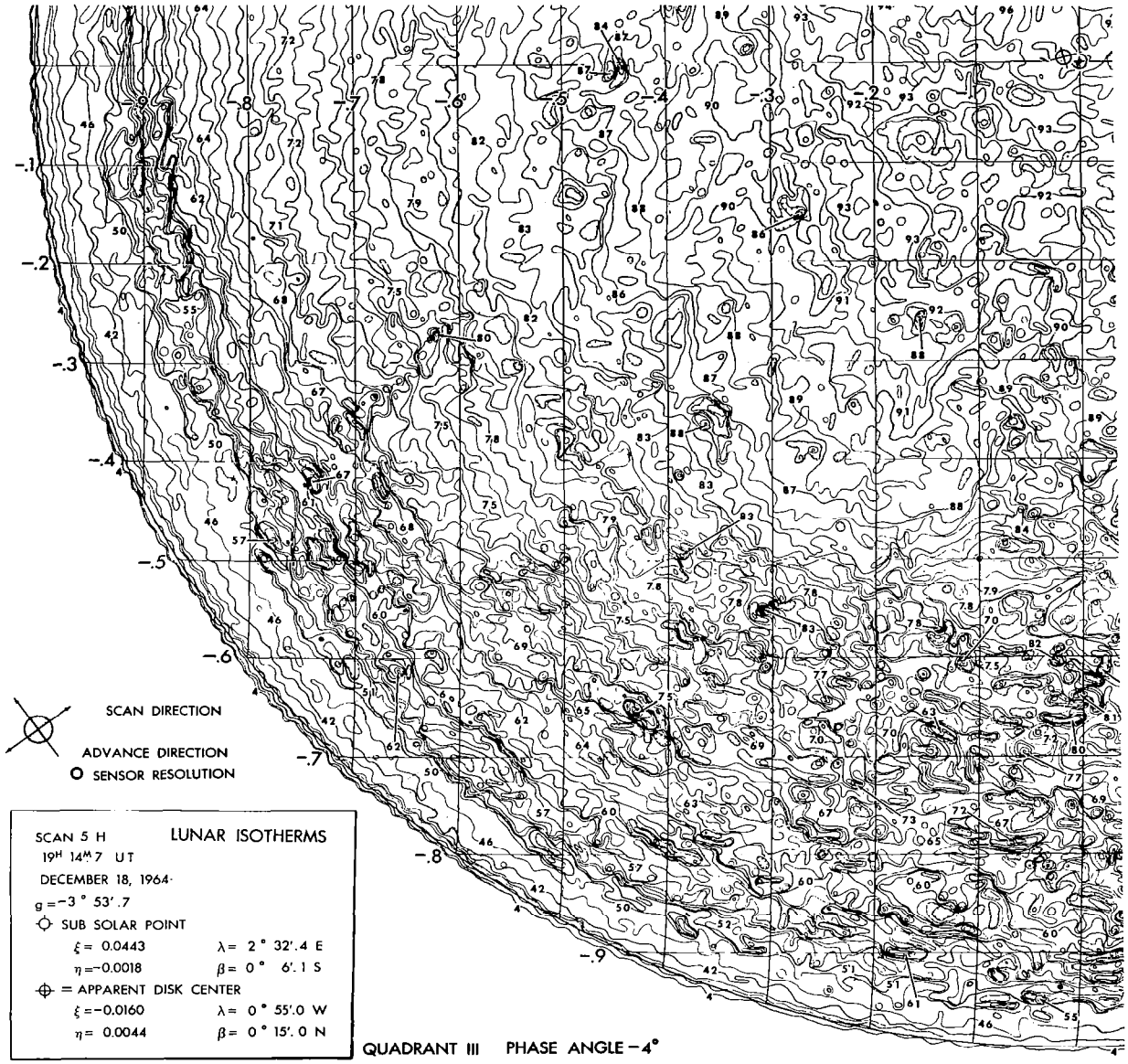
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
4	203.6	58	345.9	74	369.0	90	389.7
6	217.2	59	347.4	75	370.3	91	391.0
18	265.2	60	348.9	76	371.7	92	392.2
30	295.4	61	350.4	77	373.0	93	393.4
34	303.9	62	351.9	78	374.3	94	394.6
38	311.8	63	353.4	79	375.7	95	395.9
42	319.2	64	354.9	80	377.0	96	397.1
46	326.3	65	356.3	81	378.3	97	398.3
50	333.1	66	357.8	82	379.6		
51	334.8	67	359.2	83	380.9		
52	336.4	68	360.6	84	382.2		
53	338.0	69	362.0	85	383.4		
54	339.6	70	363.4	86	384.7		
55	341.2	71	364.8	87	386.0		
56	342.8	72	366.2	88	387.2		
57	344.3	73	367.6	89	388.5		



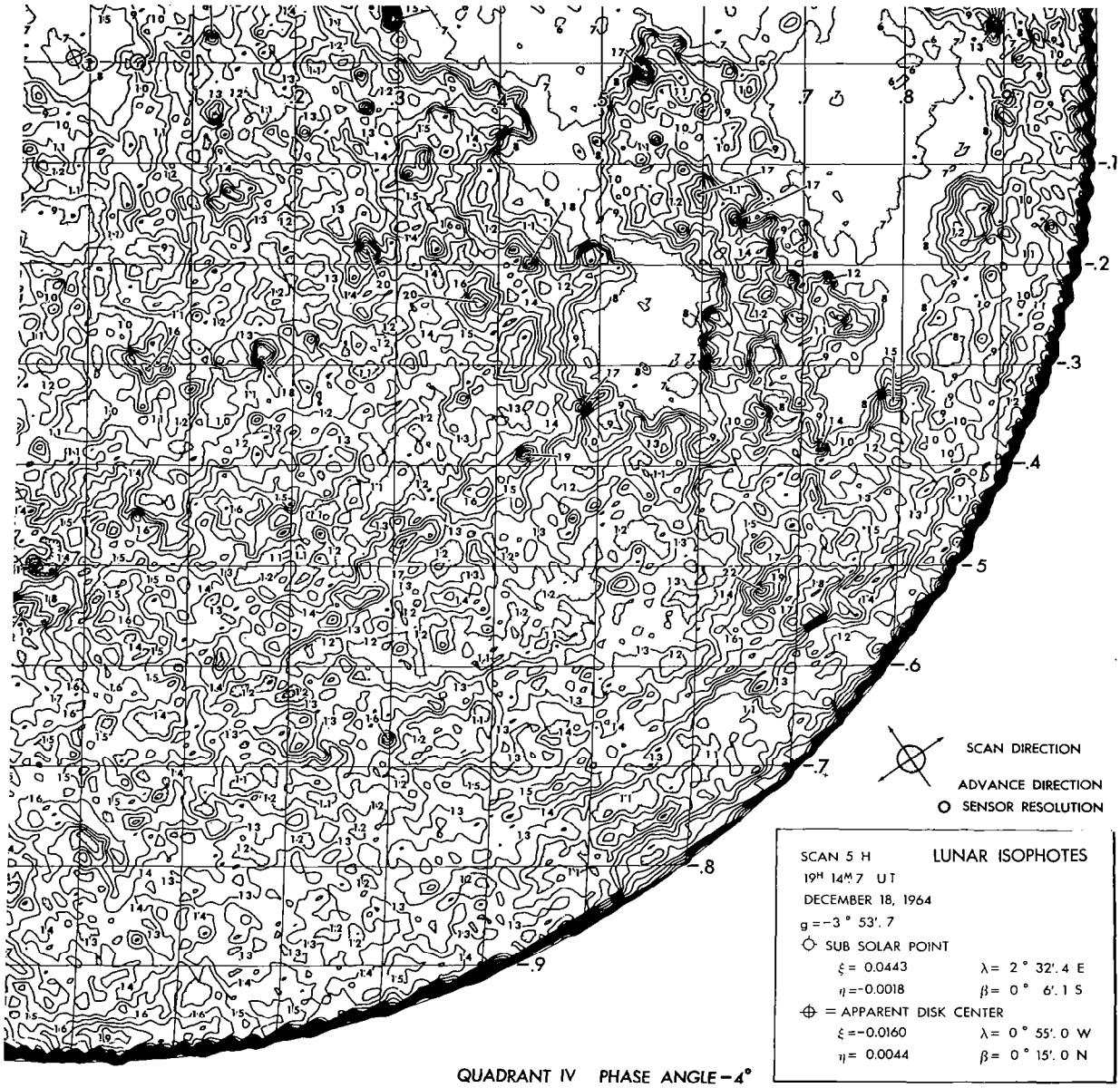
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
3	15.72	19	99.56
4	20.96	20	104.80
5	26.20	21	110.04
6	31.44	22	115.28
7	36.68	23	120.52
8	41.92	24	125.76
9	47.16	25	131.00
10	52.40		
11	57.64		
12	62.88		
13	68.12		
14	73.36		
15	78.60		
16	83.84		
17	89.08		
18	94.32		



THERMAL CALIBRATION DATA

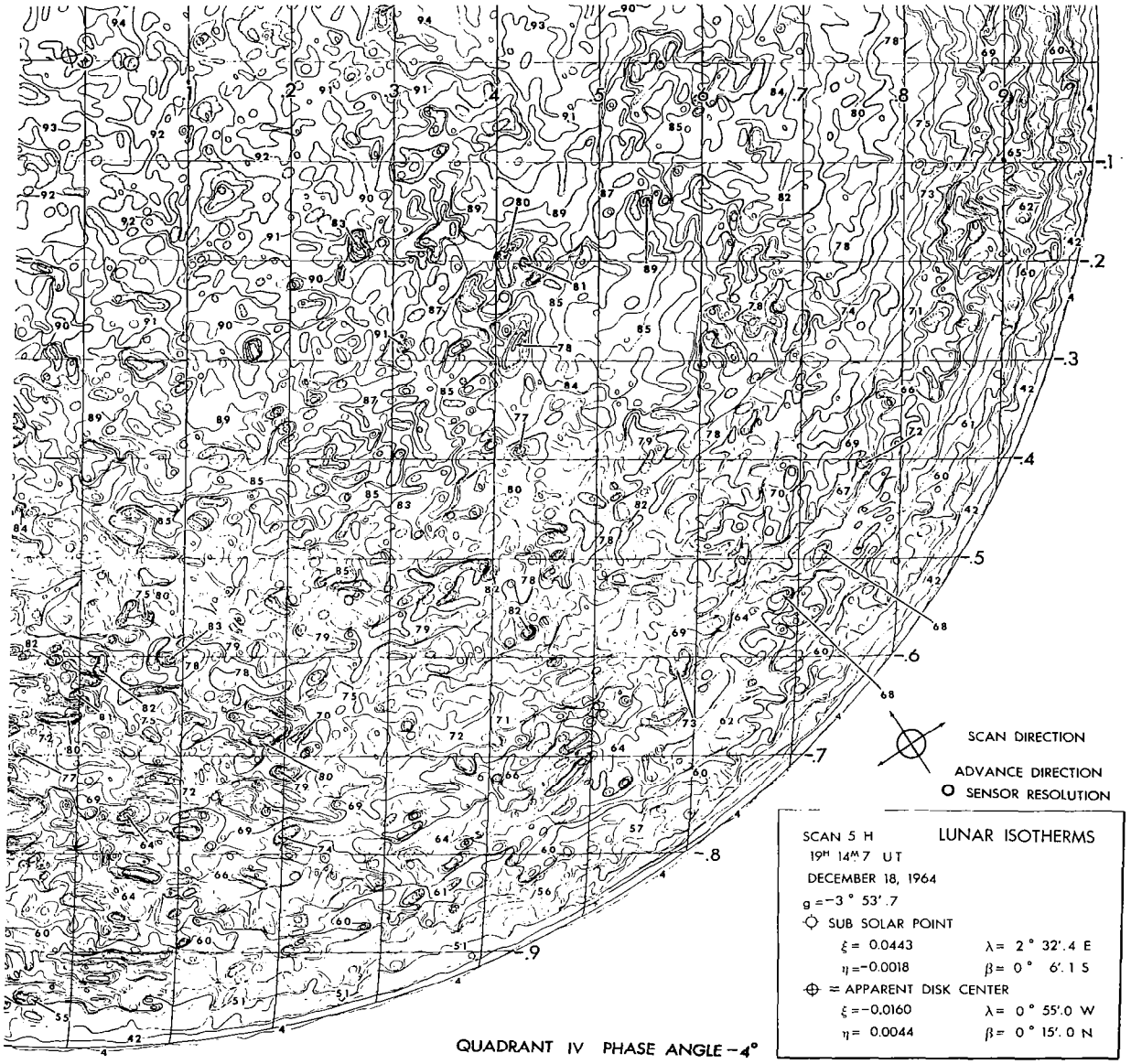
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
4	203.6	58	345.9	74	369.0	90	389.7
6	217.2	59	347.4	75	370.3	91	391.0
18	265.2	60	348.9	76	371.7	92	392.2
30	295.4	61	350.4	77	373.0	93	393.4
34	303.9	62	351.9	78	374.3	94	394.6
38	311.8	63	353.4	79	375.7	95	395.9
42	319.2	64	354.9	80	377.0	96	397.1
46	326.3	65	356.3	81	378.3	97	398.3
50	333.1	66	357.8	82	379.6		
51	334.8	67	359.2	83	380.9		
52	336.4	68	360.6	84	382.2		
53	338.0	69	362.0	85	383.4		
54	339.6	70	363.4	86	384.7		
55	341.2	71	364.8	87	386.0		
56	342.8	72	366.2	88	387.2		
57	344.3	73	367.6	89	388.5		



QUADRANT IV PHASE ANGLE −4°

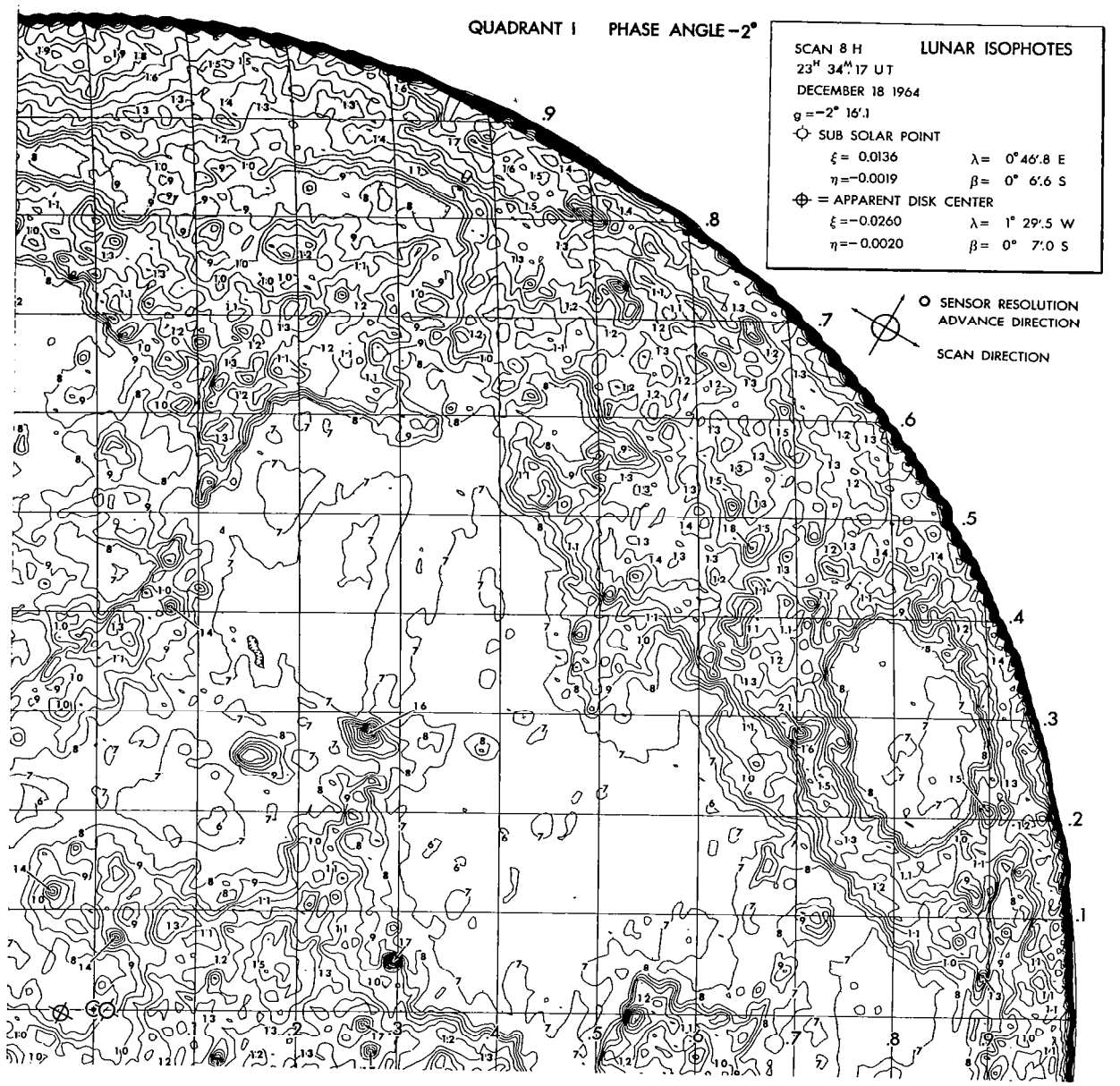
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
3	15.72	19	99.56
4	20.96	20	104.80
5	26.20	21	110.04
6	31.44	22	115.28
7	36.68	23	120.52
8	41.92	24	125.76
9	47.16	25	131.00
10	52.40		
11	57.64		
12	62.88		
13	68.12		
14	73.36		
15	78.60		
16	83.84		
17	89.08		
18	94.32		



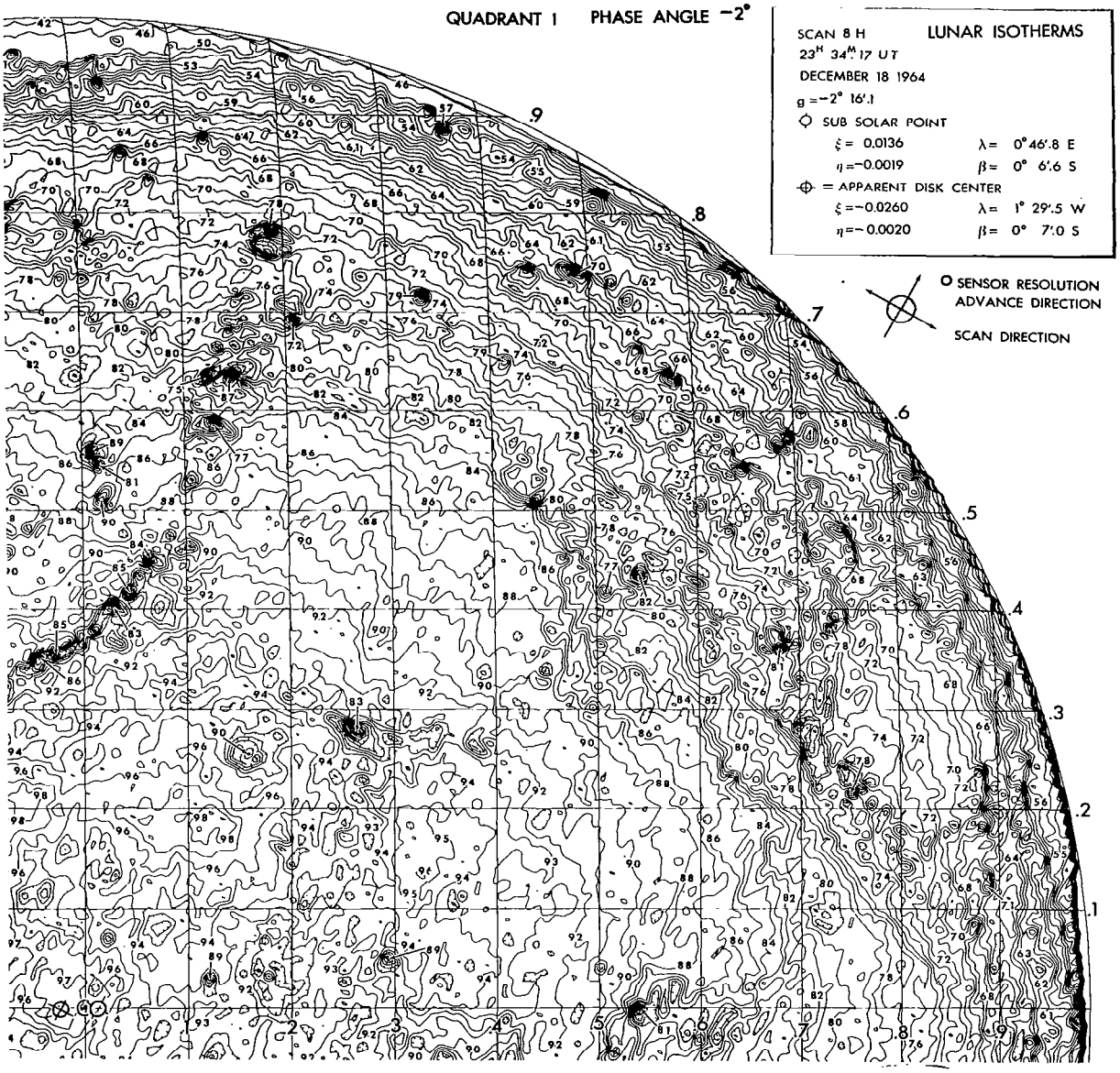
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
4	203.6	58	345.9	74	369.0	90	389.7
6	217.2	59	347.4	75	370.3	91	391.0
18	265.2	60	348.9	76	371.7	92	392.2
30	295.4	61	350.4	77	373.0	93	393.4
34	303.9	62	351.9	78	374.3	94	394.6
38	311.8	63	353.4	79	375.7	95	395.9
42	319.2	64	354.9	80	377.0	96	397.1
46	326.3	65	356.3	81	378.3	97	398.3
50	333.1	66	357.8	82	379.6		
51	334.8	67	359.2	83	380.9		
52	336.4	68	360.6	84	382.2		
53	338.0	69	362.0	85	383.4		
54	339.6	70	363.4	86	384.7		
55	341.2	71	364.8	87	386.0		
56	342.8	72	366.2	88	387.2		
57	344.3	73	367.6	89	388.5		



BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
4	22.22	20	111.12
5	27.78	21	116.68
6	33.34	22	122.23
7	38.89	23	127.79
8	44.45	24	133.34
9	50.00	25	138.90
10	55.56		
11	61.12		
12	66.67		
13	72.23		
14	77.78		
15	83.34		
16	88.90		
17	94.45		
18	100.01		
19	105.56		

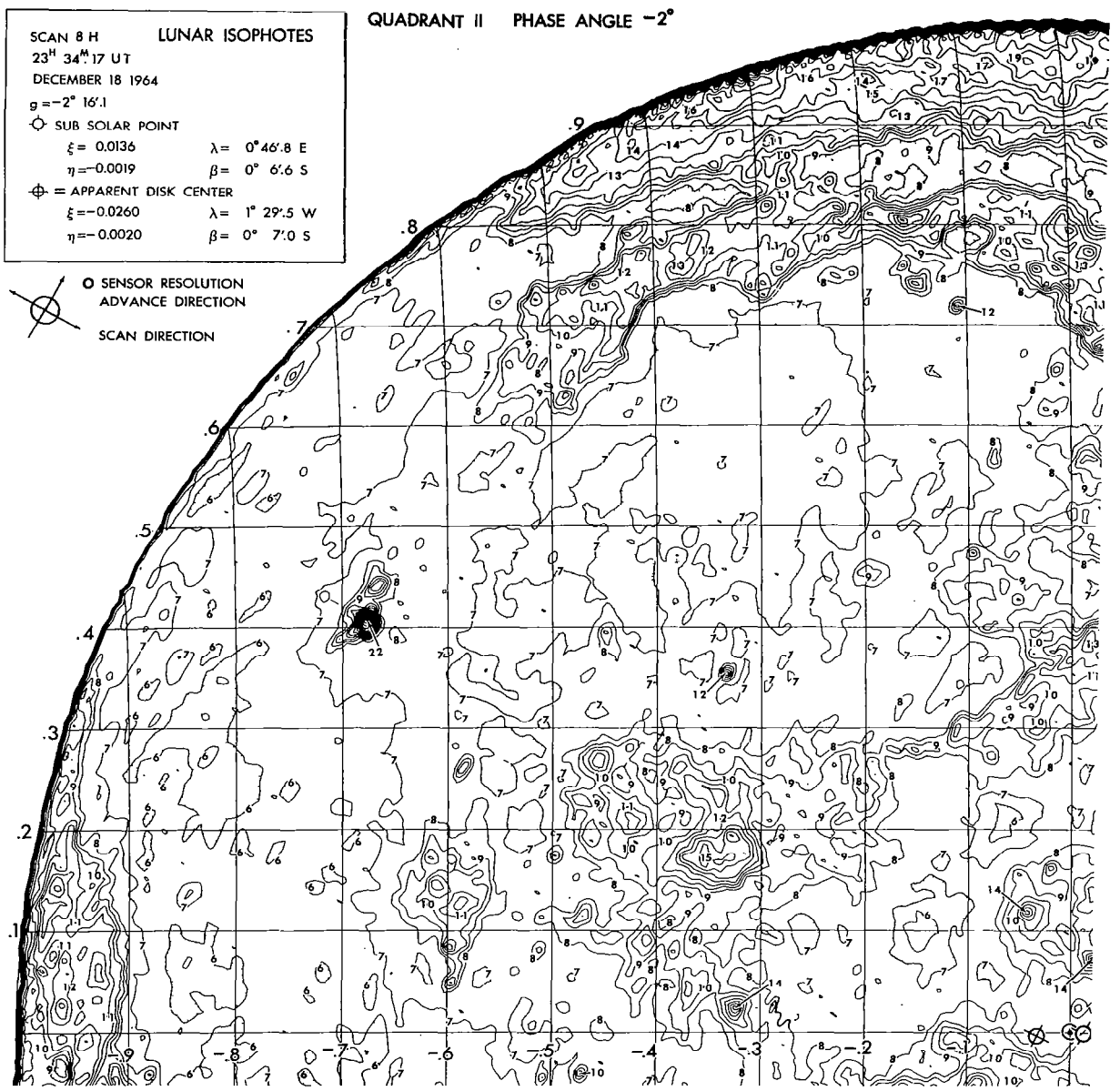


THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.7	34	304.1	58	346.2	74	369.3	90	390.2
2	183.9	36	308.2	59	347.8	75	370.7	91	391.4
4	203.7	38	312.1	60	349.3	76	372.1	92	392.6
6	217.3	40	315.9	61	350.8	77	373.4	93	393.9
*10	237.4	42	319.5	62	352.3	78	374.7	94	395.1
12	245.4	44	323.1	63	353.8	79	376.1	95	396.3
14	252.7	46	326.7	64	355.2	80	377.4	96	397.5
16	259.3	48	330.1	65	356.7	81	378.7	97	398.7
18	265.4	50	333.4	66	358.1	82	380.0	98	399.9
20	271.1	**51	335.1	67	359.6	83	381.3	99	401.1
22	276.5	52	336.7	68	361.0	84	382.6	100	402.3
24	281.7	53	338.3	69	362.4	85	383.9	101	403.5
26	286.5	54	340.0	70	363.8	86	385.1		
28	291.2	55	341.5	71	365.2	87	386.4		
30	295.7	56	343.1	72	366.6	88	387.7		
32	300.0	57	344.7	73	368.0	89	388.9		

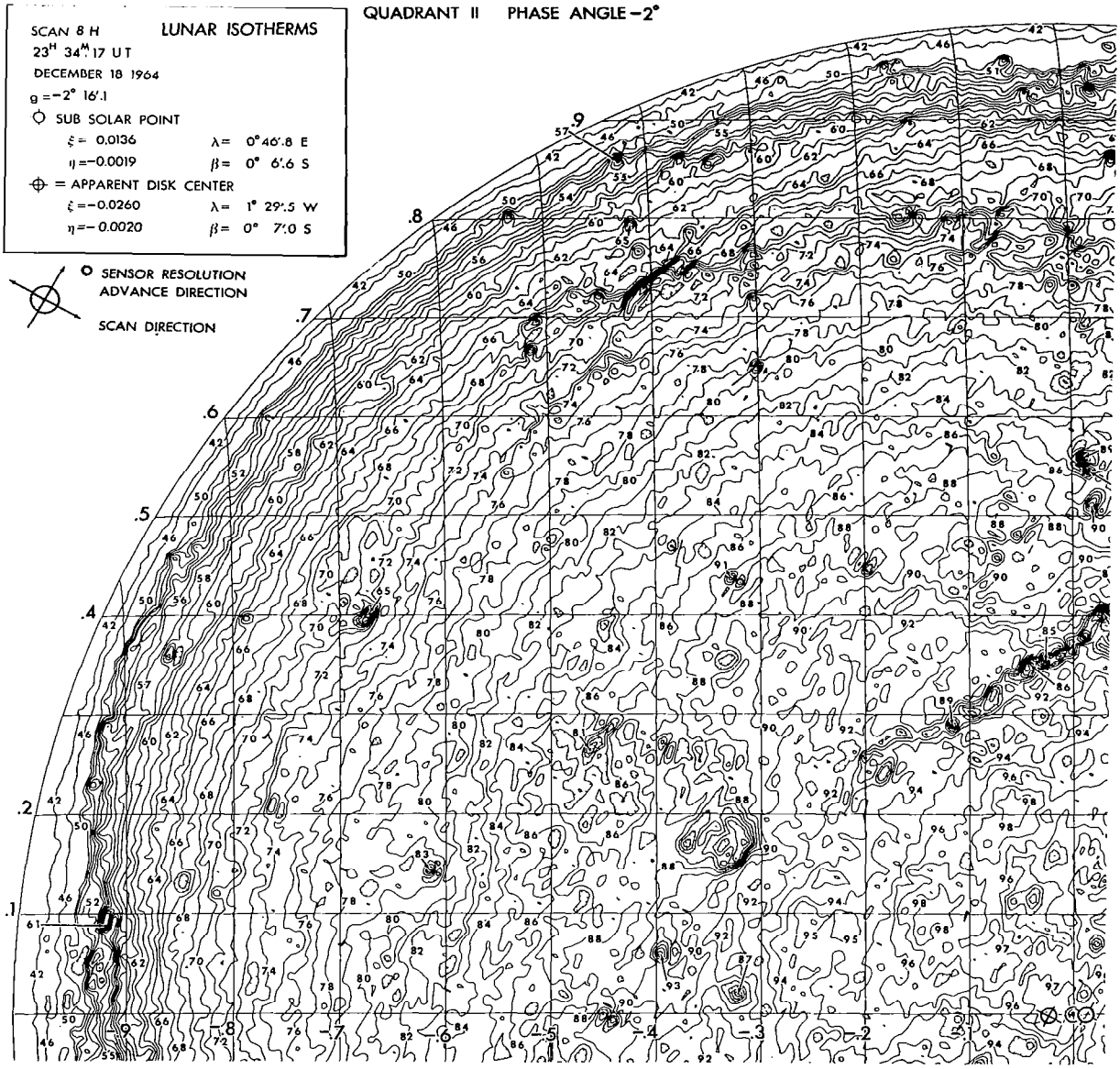
*Note level Number 8 not contoured.

**Note change in levels contoured from Number 51 on.



BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
4	22.22	20	111.12
5	27.78	21	116.68
6	33.34	22	122.23
7	38.89	23	127.79
8	44.45	24	133.34
9	50.00	25	138.90
10	55.56		
11	61.12		
12	66.67		
13	72.23		
14	77.78		
15	83.34		
16	88.90		
17	94.45		
18	100.01		
19	105.56		

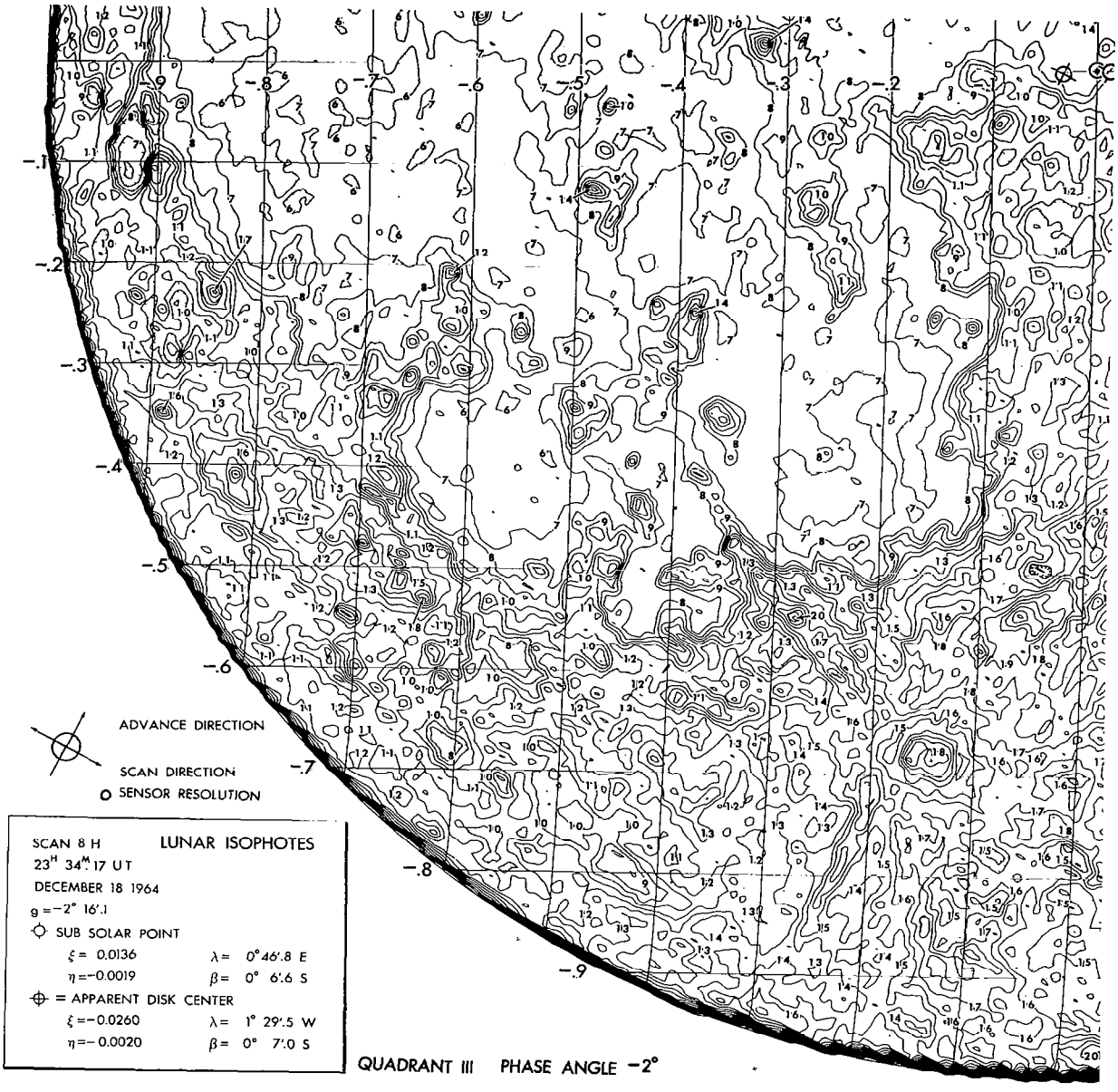


THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.7	34	304.1	58	346.2	74	369.3	90	390.2
2	183.9	36	308.2	59	347.8	75	370.7	91	391.4
4	203.7	38	312.1	60	349.3	76	372.1	92	392.6
6	217.3	40	315.9	61	350.8	77	373.4	93	393.9
*10	237.4	42	319.5	62	352.3	78	374.7	94	395.1
12	245.4	44	323.1	63	353.8	79	376.1	95	396.3
14	252.7	46	326.7	64	355.2	80	377.4	96	397.5
16	259.3	48	330.1	65	356.7	81	378.7	97	398.7
18	265.4	50	333.4	66	358.1	82	380.0	98	399.9
20	271.1	**51	335.1	67	359.6	83	381.3	99	401.1
22	276.5	52	336.7	68	361.0	84	382.6	100	402.3
24	281.7	53	338.3	69	362.4	85	383.9	101	403.5
26	286.5	54	340.0	70	363.8	86	385.1		
28	291.2	55	341.5	71	365.2	87	386.4		
30	295.7	56	343.1	72	366.6	88	387.7		
32	300.0	57	344.7	73	368.0	89	388.9		

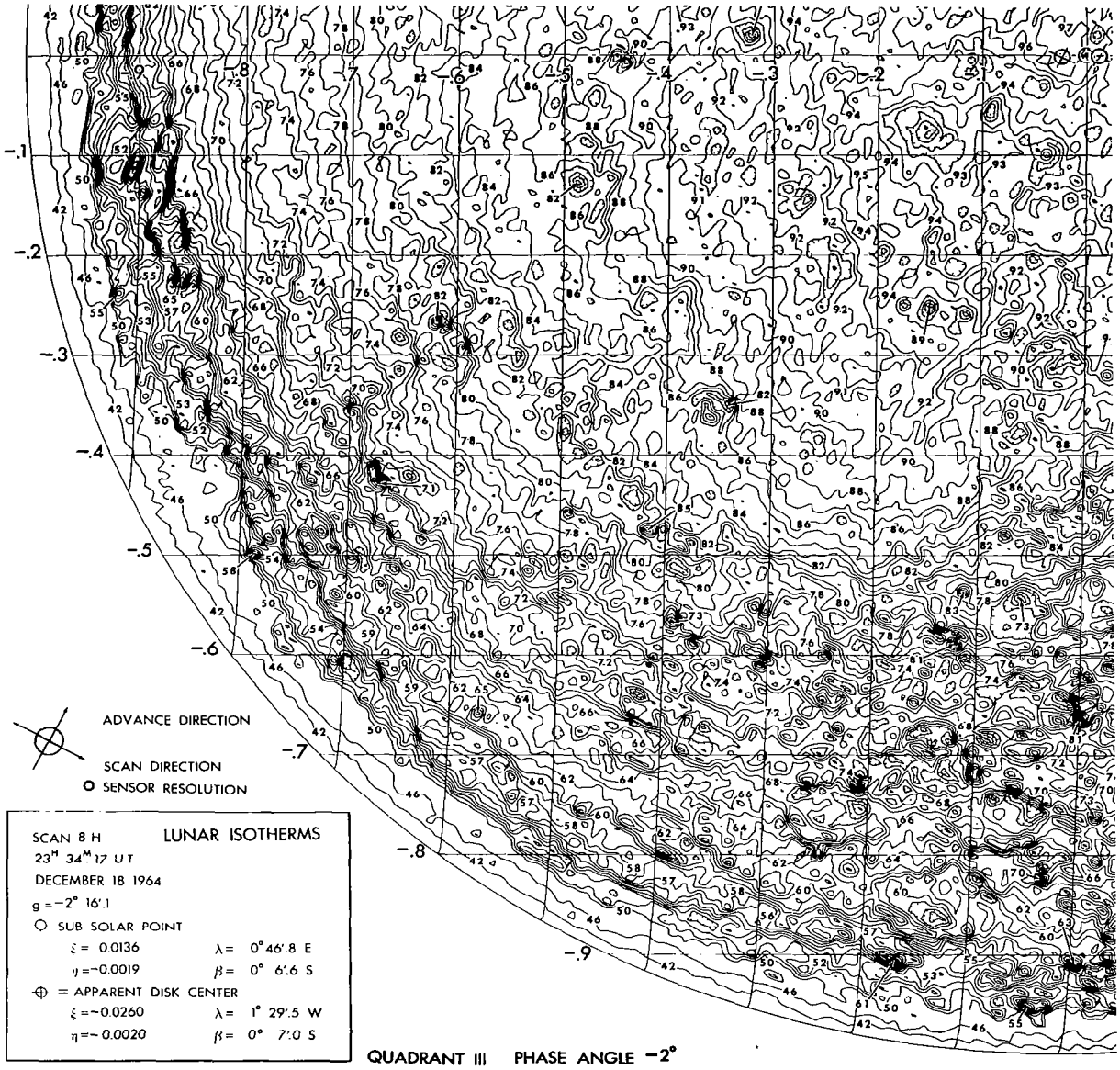
*Note level Number 8 not contoured.

**Note change in levels contoured from Number 51 on.



BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
4	22.22	20	111.12
5	27.78	21	116.68
6	33.34	22	122.23
7	38.89	23	127.79
8	44.45	24	133.34
9	50.00	25	138.90
10	55.56		
11	61.12		
12	66.67		
13	72.23		
14	77.78		
15	83.34		
16	88.90		
17	94.45		
18	100.01		
19	105.56		

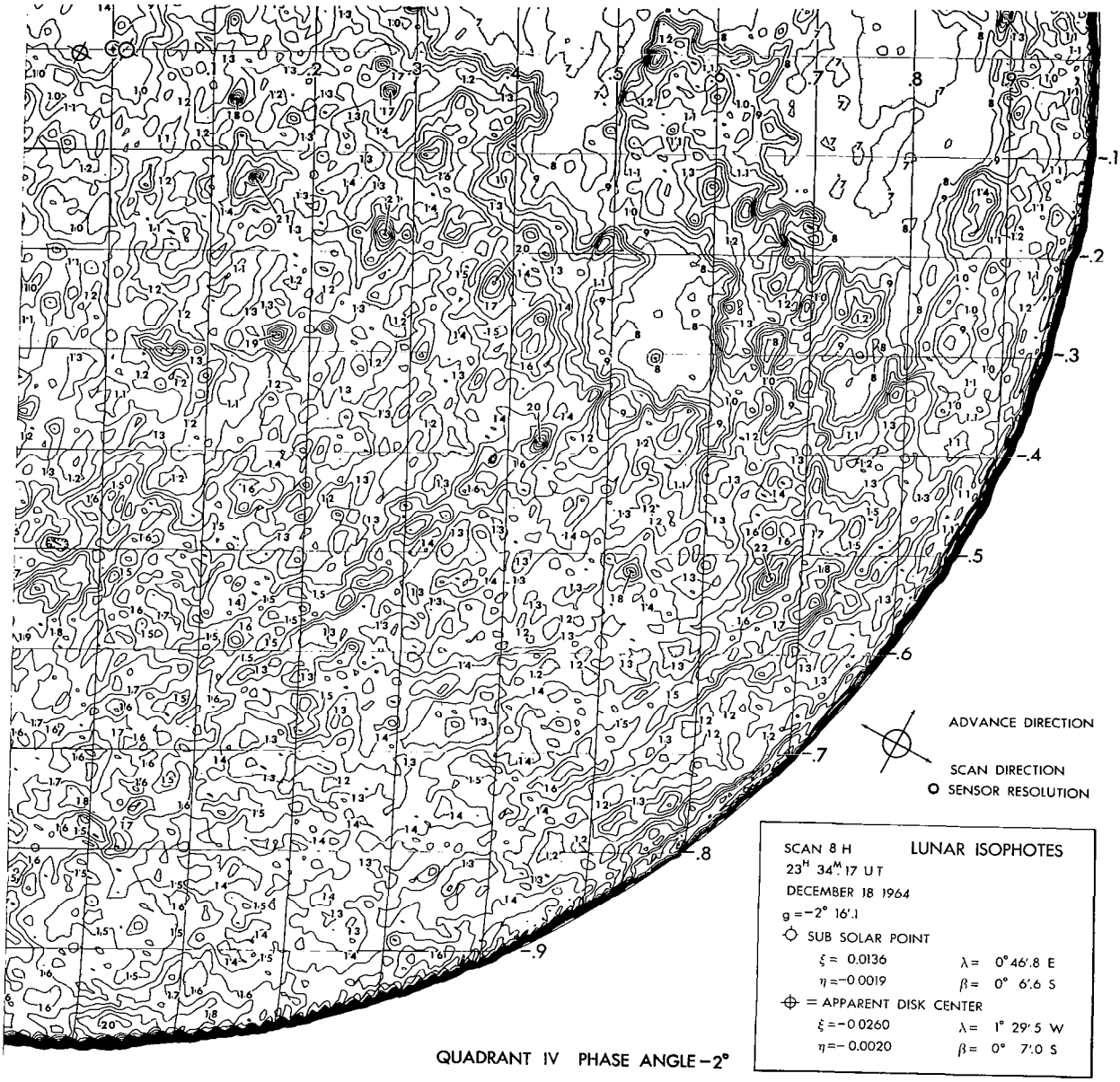


THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.7	34	304.1	58	346.2	74	369.3	90	390.2
2	183.9	36	308.2	59	347.8	75	370.7	91	391.4
4	203.7	38	312.1	60	349.3	76	372.1	92	392.6
6	217.3	40	315.9	61	350.8	77	373.4	93	393.9
*10	237.4	42	319.5	62	352.3	78	374.7	94	395.1
12	245.4	44	323.1	63	353.8	79	376.1	95	396.3
14	252.7	46	326.7	64	355.2	80	377.4	96	397.5
16	259.3	48	330.1	65	356.7	81	378.7	97	398.7
18	265.4	50	333.4	66	358.1	82	380.0	98	399.9
20	271.1	**51	335.1	67	359.6	83	381.3	99	401.1
22	276.5	52	336.7	68	361.0	84	382.6	100	402.3
24	281.7	53	338.3	69	362.4	85	383.9	101	403.5
26	286.5	54	340.0	70	363.8	86	385.1		
28	291.2	55	341.5	71	365.2	87	386.4		
30	295.7	56	343.1	72	366.6	88	387.7		
32	300.0	57	344.7	73	368.0	89	388.9		

*Note level Number 8 not contoured.

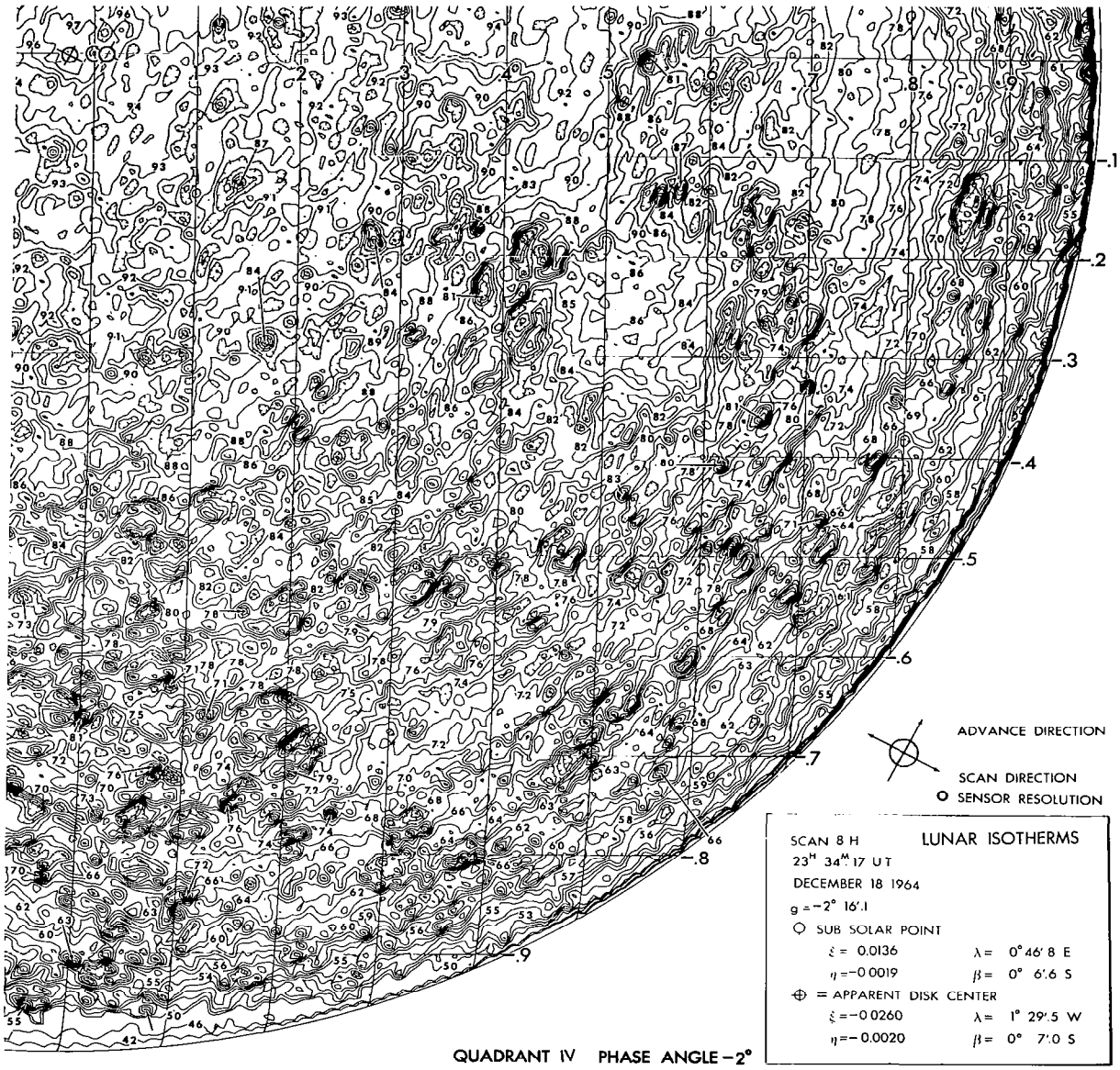
**Note change in levels contoured from Number 51 on.



QUADRANT IV PHASE ANGLE −2°

BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
4	22.22	20	111.12
5	27.78	21	116.68
6	33.34	22	122.23
7	38.89	23	127.79
8	44.45	24	133.34
9	50.00	25	138.90
10	55.56		
11	61.12		
12	66.67		
13	72.23		
14	77.78		
15	83.34		
16	88.90		
17	94.45		
18	100.01		
19	105.56		



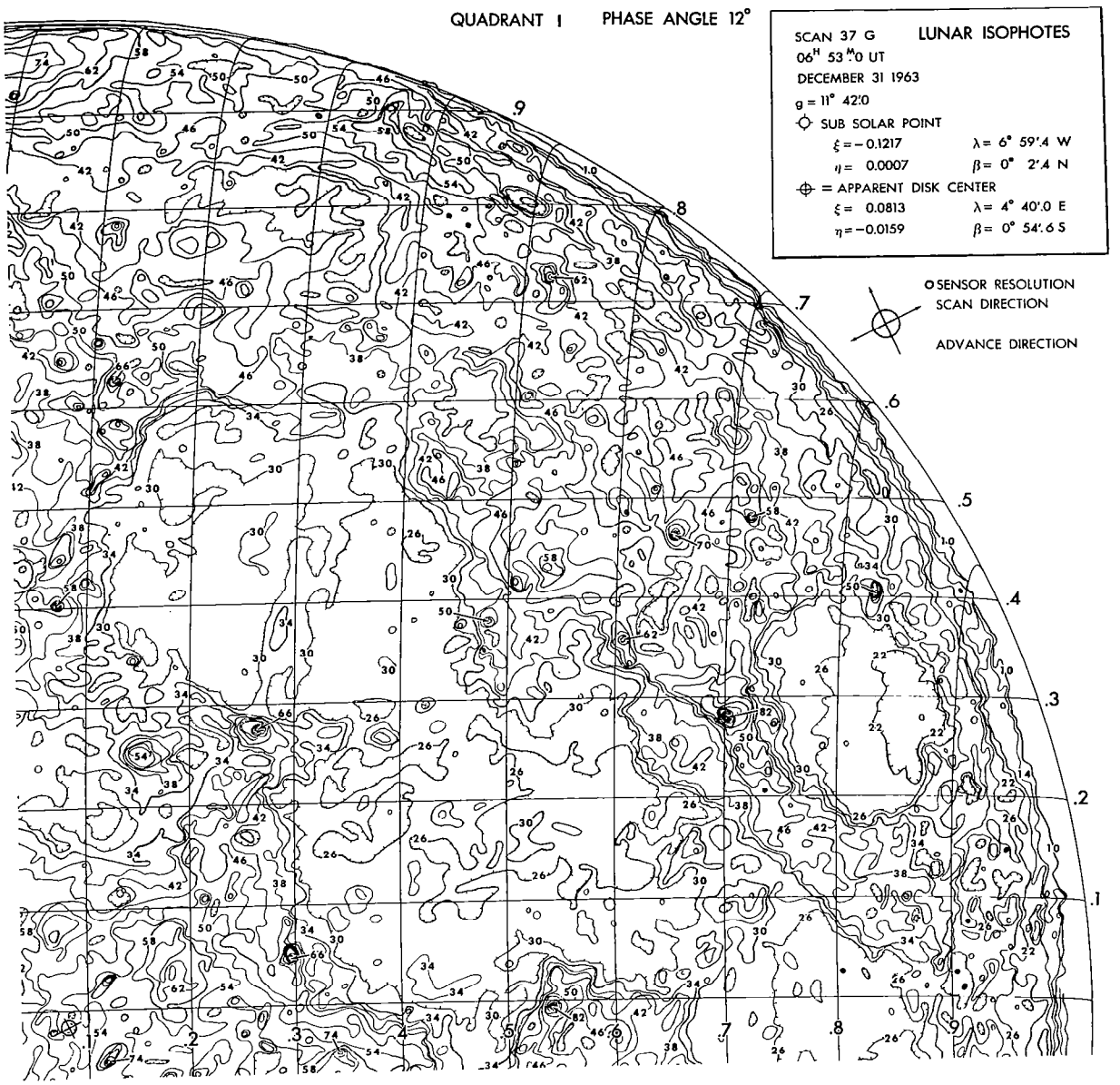
QUADRANT IV PHASE ANGLE −2°

THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.7	34	304.1	58	346.2	74	369.3	90	390.2
2	183.9	36	308.2	59	347.8	75	370.7	91	391.4
4	203.7	38	312.1	60	349.3	76	372.1	92	392.6
6	217.3	40	315.9	61	350.8	77	373.4	93	393.9
*10	237.4	42	319.5	62	352.3	78	374.7	94	395.1
12	245.4	44	323.1	63	353.8	79	376.1	95	396.3
14	252.7	46	326.7	64	355.2	80	377.4	96	397.5
16	259.3	48	330.1	65	356.7	81	378.7	97	398.7
18	265.4	50	333.4	66	358.1	82	380.0	98	399.9
20	271.1	**51	335.1	67	359.6	83	381.3	99	401.1
22	276.5	52	336.7	68	361.0	84	382.6	100	402.3
24	281.7	53	338.3	69	362.4	85	383.9	101	403.5
26	286.5	54	340.0	70	363.8	86	385.1		
28	291.2	55	341.5	71	365.2	87	386.4		
30	295.7	56	343.1	72	366.6	88	387.7		
32	300.0	57	344.7	73	368.0	89	388.9		

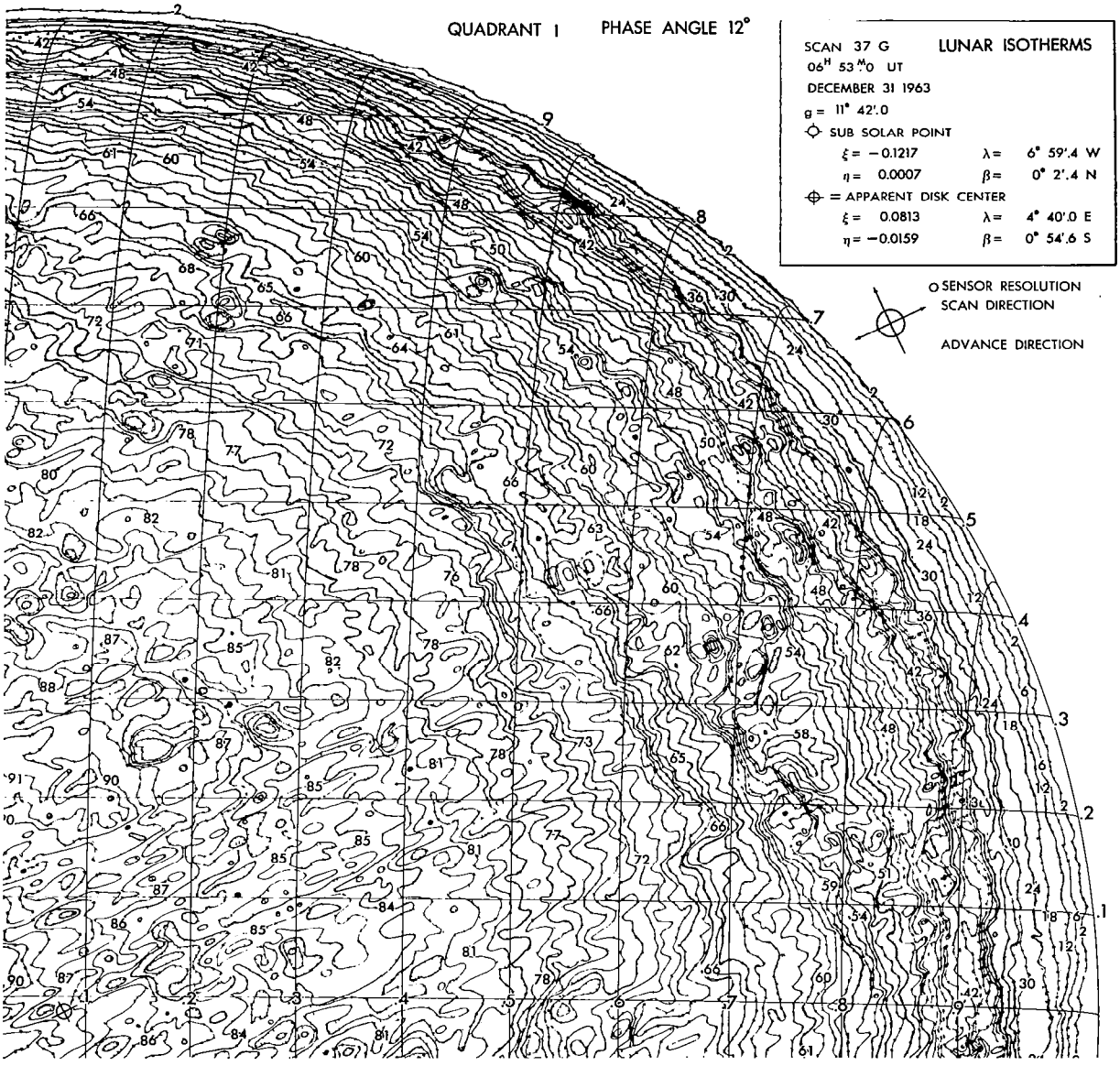
*Note level Number 8 not contoured.

**Note change in levels contoured from Number 51 on.



BRIGHTNESS CALIBRATION DATA

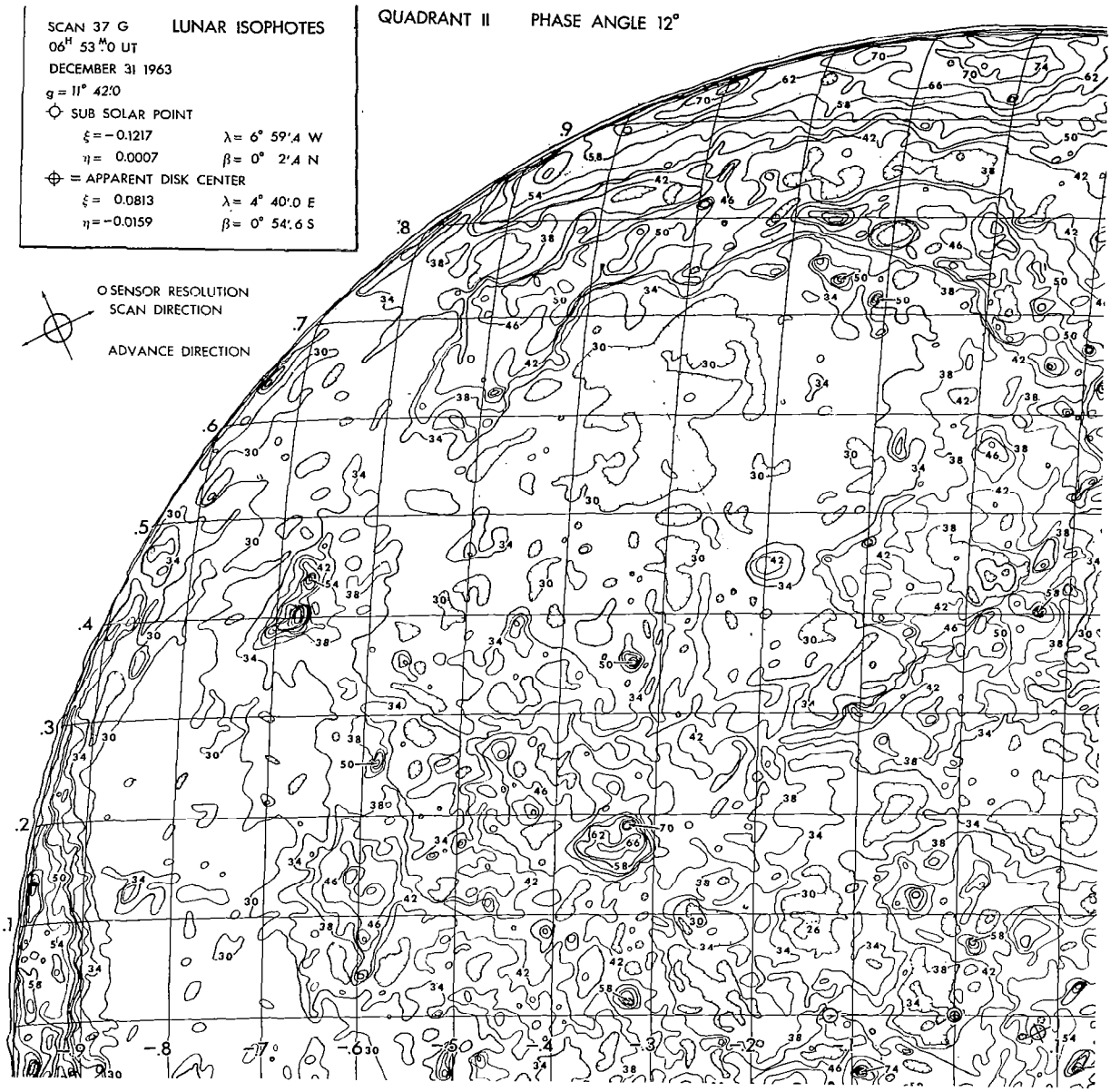
Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.84	66	60.58
6	5.51	70	64.25
10	9.18	74	67.92
14	12.85	78	71.60
18	16.52	82	75.27
22	20.19	86	78.94
26	23.87	90	82.61
30	27.54	94	86.28
34	31.21	98	89.95
38	34.88	102	93.62
42	38.55	106	97.30
46	42.22	110	100.97
50	45.89	114	104.64
54	49.57	118	108.31
58	53.24		
62	56.91		



THERMAL CALIBRATION DATA

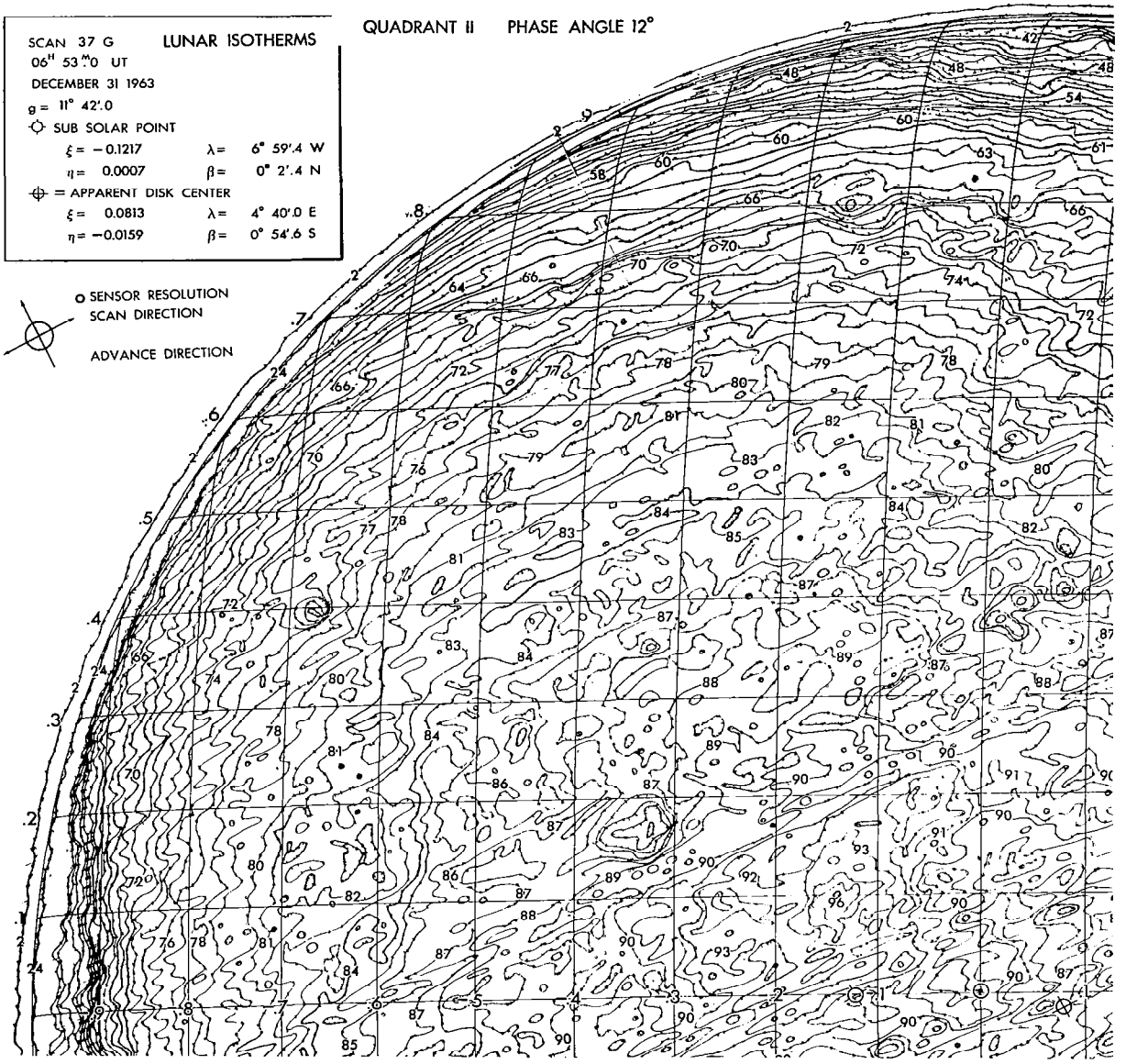
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	185.2	34	307.4	51	339.0	67	364.1	83	386.3
4	205.2	36	311.5	52	340.7	68	365.5	84	387.6
6	219.1	*37	313.5	53	342.4	69	367.0	85	388.9
8	230.1	38	315.5	54	344.0	70	368.4	86	390.2
10	239.4	39	317.5	55	345.6	71	369.8	87	391.5
12	247.6	40	319.4	56	347.2	72	371.3	88	392.8
14	255.0	41	321.3	57	348.8	73	372.7	89	394.1
16	261.7	42	323.2	58	350.4	74	374.1	90	395.4
18	268.0	43	325.0	59	352.0	75	375.5	91	396.7
20	273.8	44	326.8	60	353.5	76	376.8	92	397.9
22	279.3	45	328.6	61	355.1	77	378.2	93	399.2
24	284.5	46	330.4	62	356.6	78	379.6	94	400.4
26	289.5	47	332.2	63	358.1	79	380.9	95	401.7
28	294.2	48	333.9	64	359.6	80	382.3	96	402.9
30	298.8	49	335.6	65	361.1	81	383.6	97	404.2
32	303.2	50	337.3	66	362.6	82	385.0		

*Note change in levels contoured from Number 37 on.



BRIGHTNESS CALIBRATION DATA

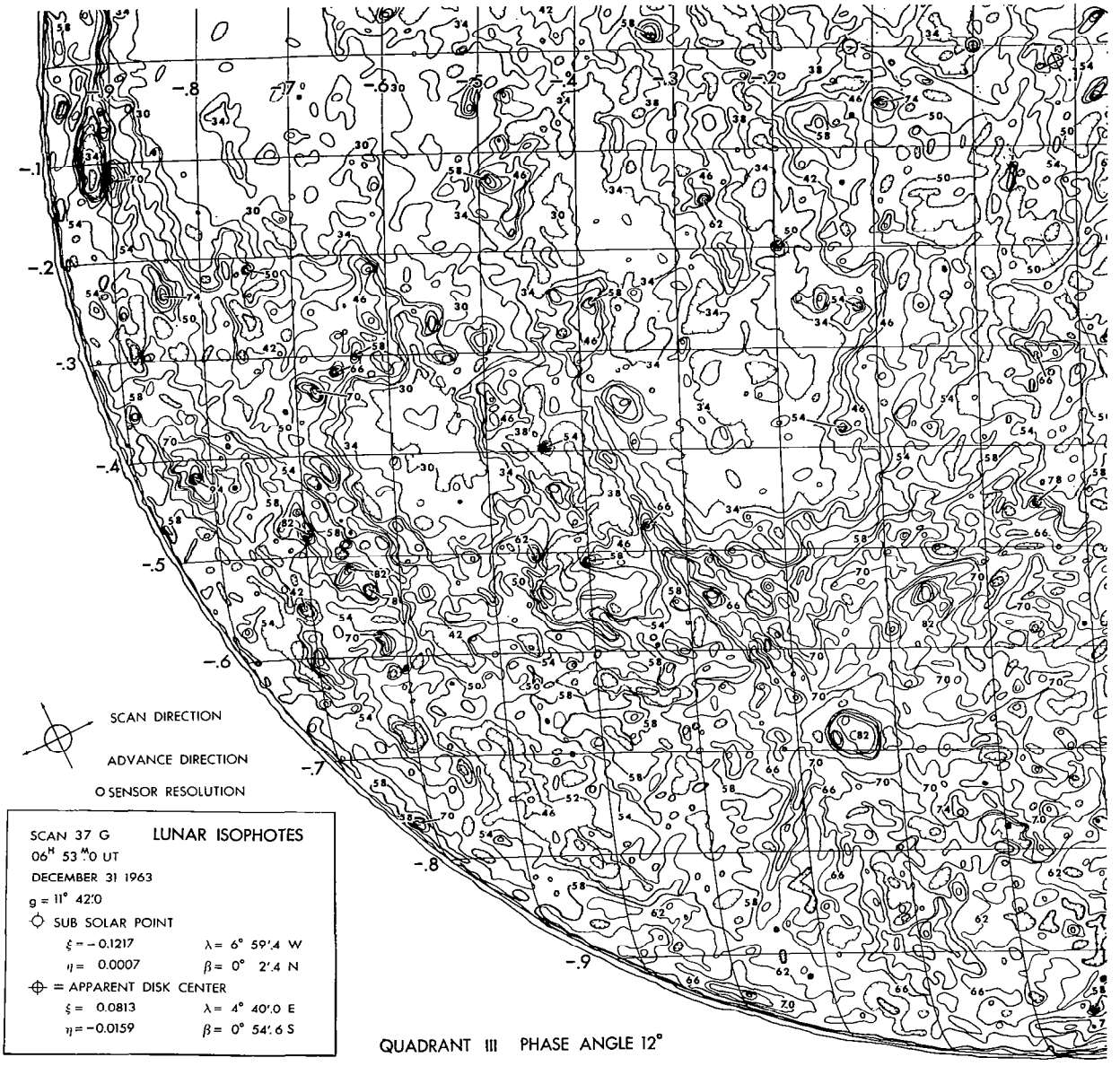
Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.84	66	60.58
6	5.51	70	64.25
10	9.18	74	67.92
14	12.85	78	71.60
18	16.52	82	75.27
22	20.19	86	78.94
26	23.87	90	82.61
30	27.54	94	86.28
34	31.21	98	89.95
38	34.88	102	93.62
42	38.55	106	97.30
46	42.22	110	100.97
50	45.89	114	104.64
54	49.57	118	108.31
58	53.24		
62	56.91		



THERMAL CALIBRATION DATA

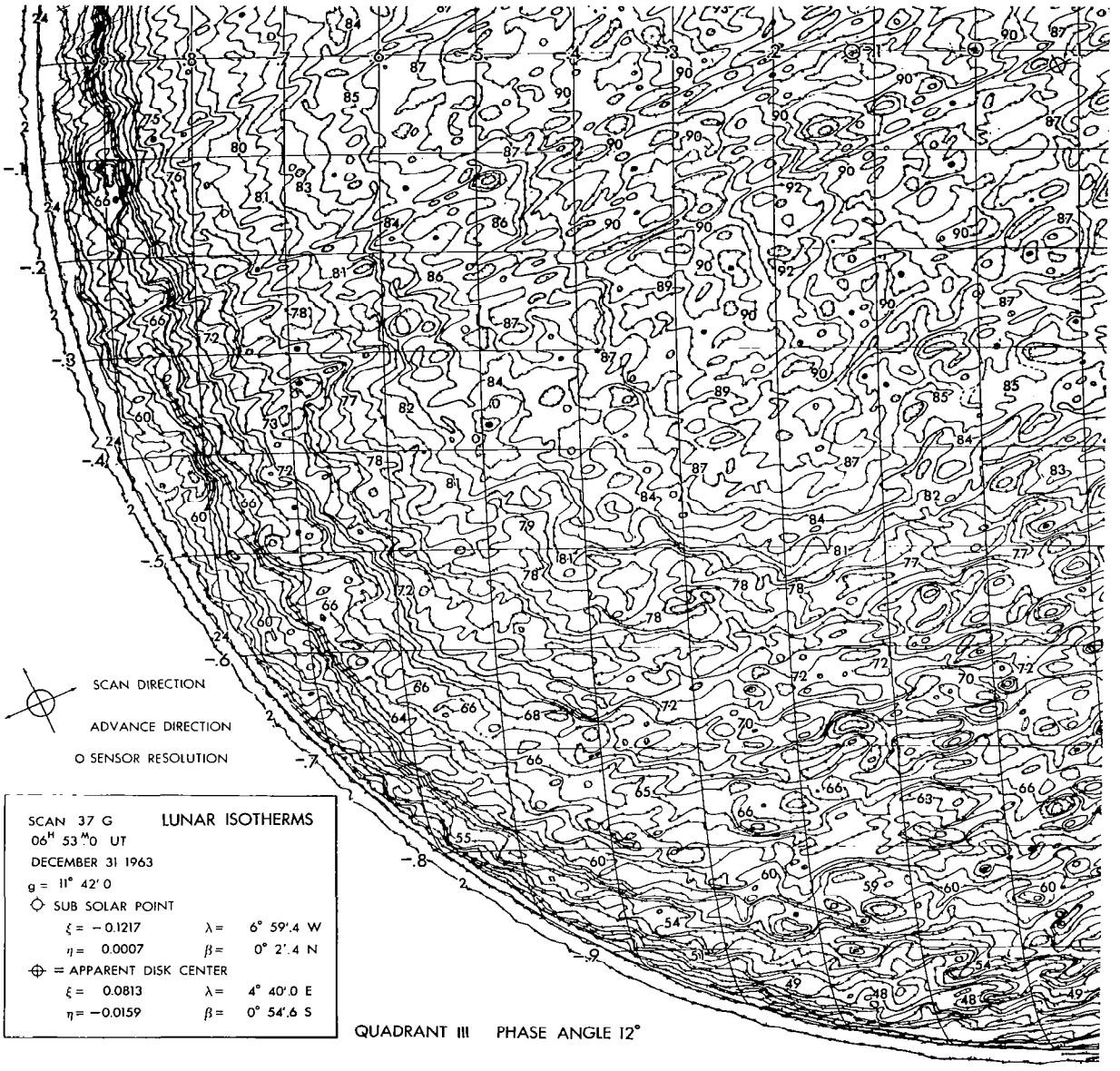
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	185.2	34	307.4	51	339.0	67	364.1	83	386.3
4	205.2	36	311.5	52	340.7	68	365.5	84	387.6
6	219.1	*37	313.5	53	342.4	69	367.0	85	388.9
8	230.1	38	315.5	54	344.0	70	368.4	86	390.2
10	239.4	39	317.5	55	345.6	71	369.8	87	391.5
12	247.6	40	319.4	56	347.2	72	371.3	88	392.8
14	255.0	41	321.3	57	348.8	73	372.7	89	394.1
16	261.7	42	323.2	58	350.4	74	374.1	90	395.4
18	268.0	43	325.0	59	352.0	75	375.5	91	396.7
20	273.8	44	326.8	60	353.5	76	376.8	92	397.9
22	279.3	45	328.6	61	355.1	77	378.2	93	399.2
24	284.5	46	330.4	62	356.6	78	379.6	94	400.4
26	289.5	47	332.2	63	358.1	79	380.9	95	401.7
28	294.2	48	333.9	64	359.6	80	382.3	96	402.9
30	298.8	49	335.6	65	361.1	81	383.6	97	404.2
32	303.2	50	337.3	66	362.6	82	385.0		

*Note change in levels contoured from Number 37 on.



BRIGHTNESS CALIBRATION DATA

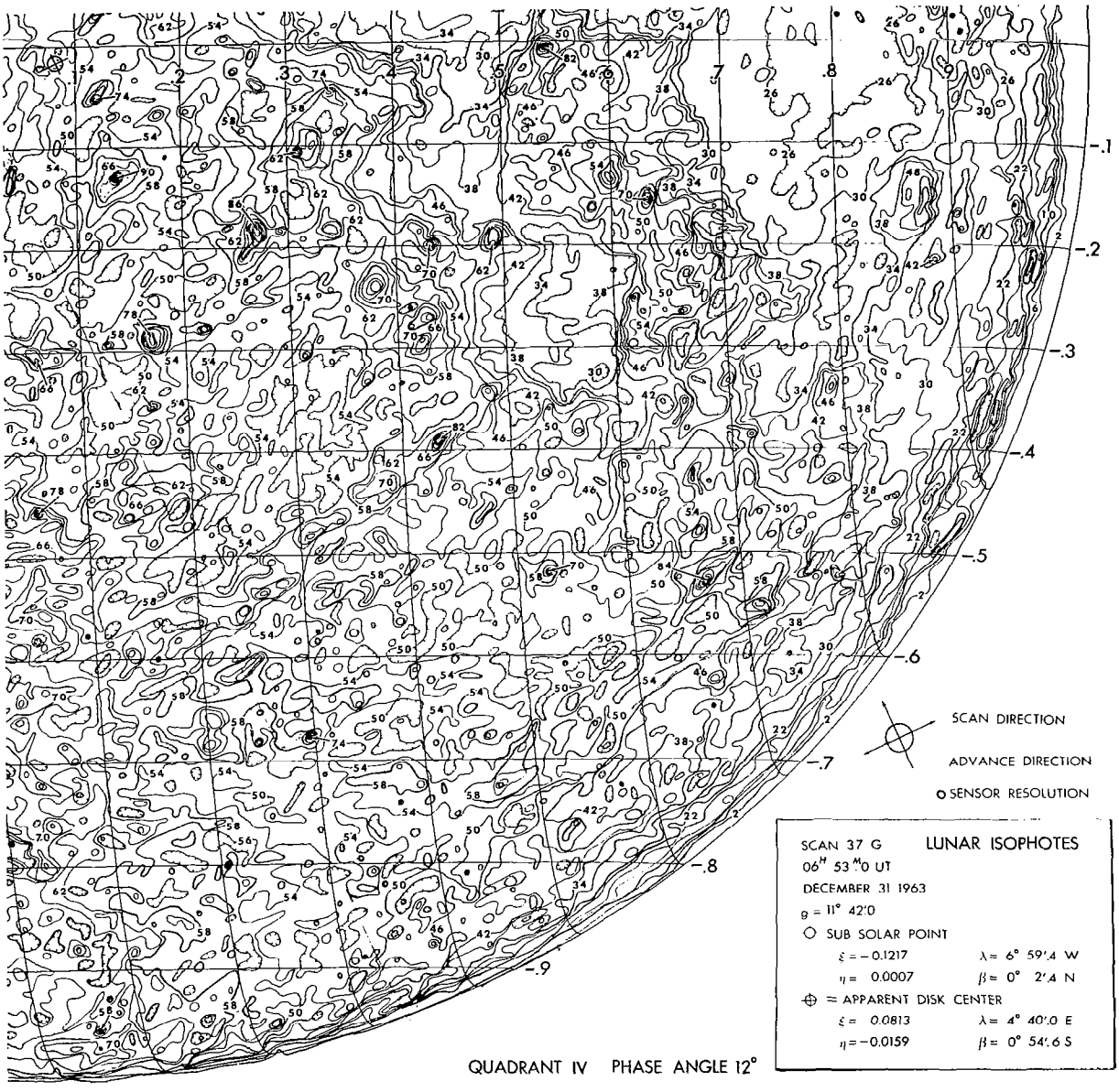
Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.84	66	60.58
6	5.51	70	64.25
10	9.18	74	67.92
14	12.85	78	71.60
18	16.52	82	75.27
22	20.19	86	78.94
26	23.87	90	82.61
30	27.54	94	86.28
34	31.21	98	89.95
38	34.88	102	93.62
42	38.55	106	97.30
46	42.22	110	100.97
50	45.89	114	104.64
54	49.57	118	108.31
58	53.24		
62	56.91		



THERMAL CALIBRATION DATA

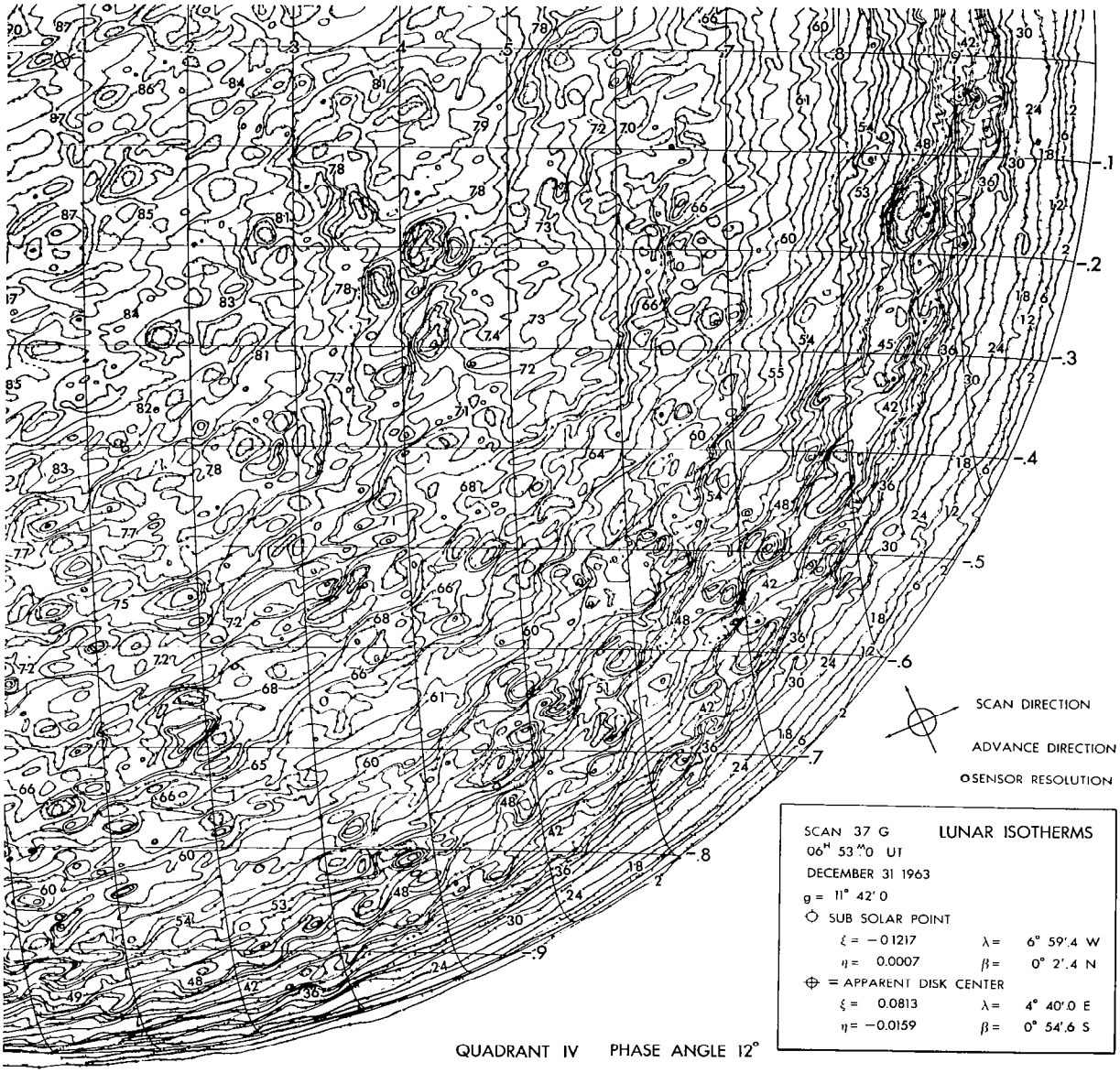
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	185.2	34	307.4	51	339.0	67	364.1	83	386.3
4	205.2	36	311.5	52	340.7	68	365.5	84	387.6
6	219.1	*37	313.5	53	342.4	69	367.0	85	388.9
8	230.1	38	315.5	54	344.0	70	368.4	86	390.2
10	239.4	39	317.5	55	345.6	71	369.8	87	391.5
12	247.6	40	319.4	56	347.2	72	371.3	88	392.8
14	255.0	41	321.3	57	348.8	73	372.7	89	394.1
16	261.7	42	323.2	58	350.4	74	374.1	90	395.4
18	268.0	43	325.0	59	352.0	75	375.5	91	396.7
20	273.8	44	326.8	60	353.5	76	376.8	92	397.9
22	279.3	45	328.6	61	355.1	77	378.2	93	399.2
24	284.5	46	330.4	62	356.6	78	379.6	94	400.4
26	289.5	47	332.2	63	358.1	79	380.9	95	401.7
28	294.2	48	333.9	64	359.6	80	382.3	96	402.9
30	298.8	49	335.6	65	361.1	81	383.6	97	404.2
32	303.2	50	337.3	66	362.6	82	385.0		

*Note change in levels contoured from Number 37 on.



BRIGHTNESS CALIBRATION DATA

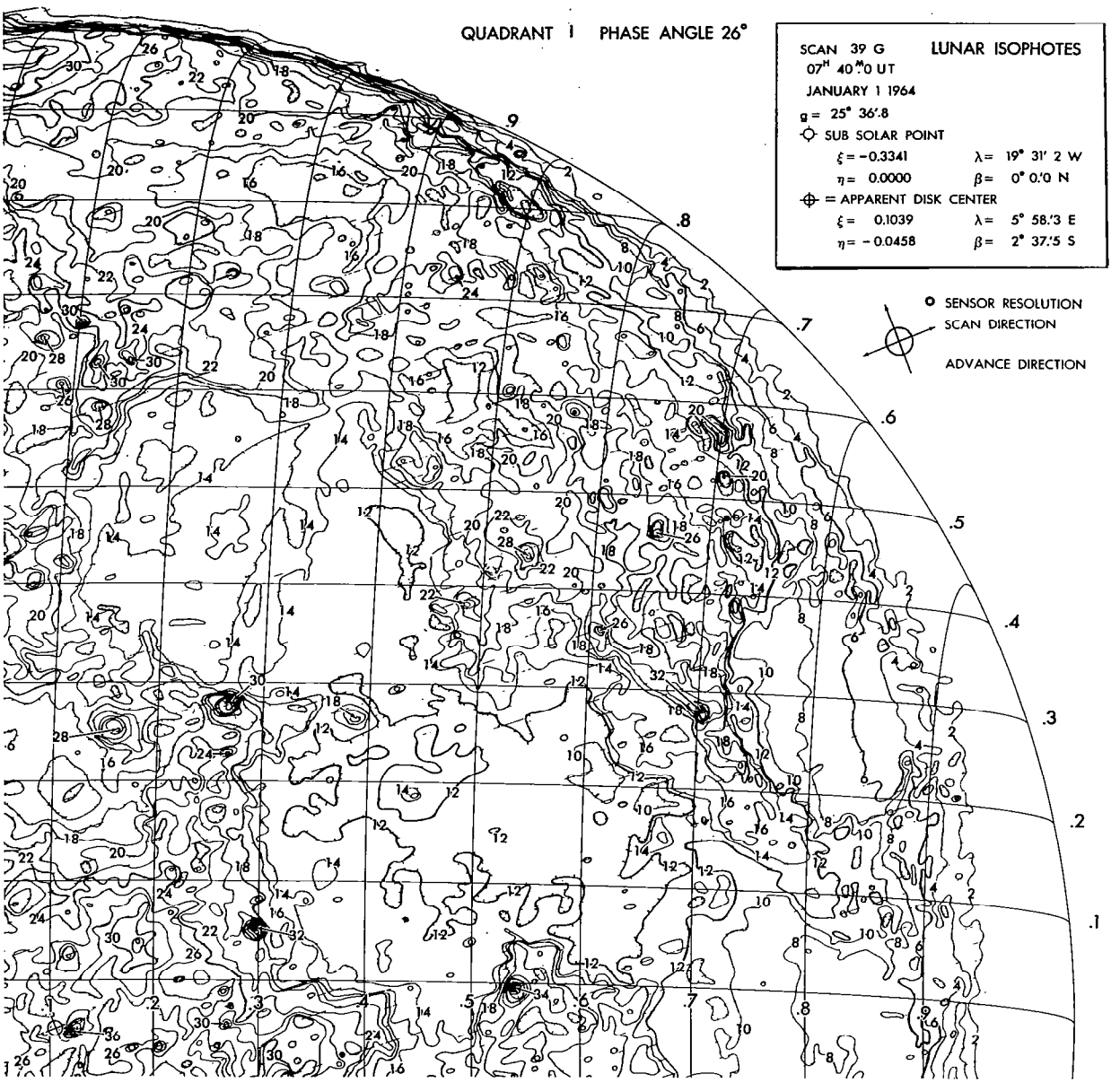
Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.84	66	60.58
6	5.51	70	64.25
10	9.18	74	67.92
14	12.85	78	71.60
18	16.52	82	75.27
22	20.19	86	78.94
26	23.87	90	82.61
30	27.54	94	86.28
34	31.21	98	89.95
38	34.88	102	93.62
42	38.55	106	97.30
46	42.22	110	100.97
50	45.89	114	104.64
54	49.57	118	108.31
58	53.24		
62	56.91		



THERMAL CALIBRATION DATA

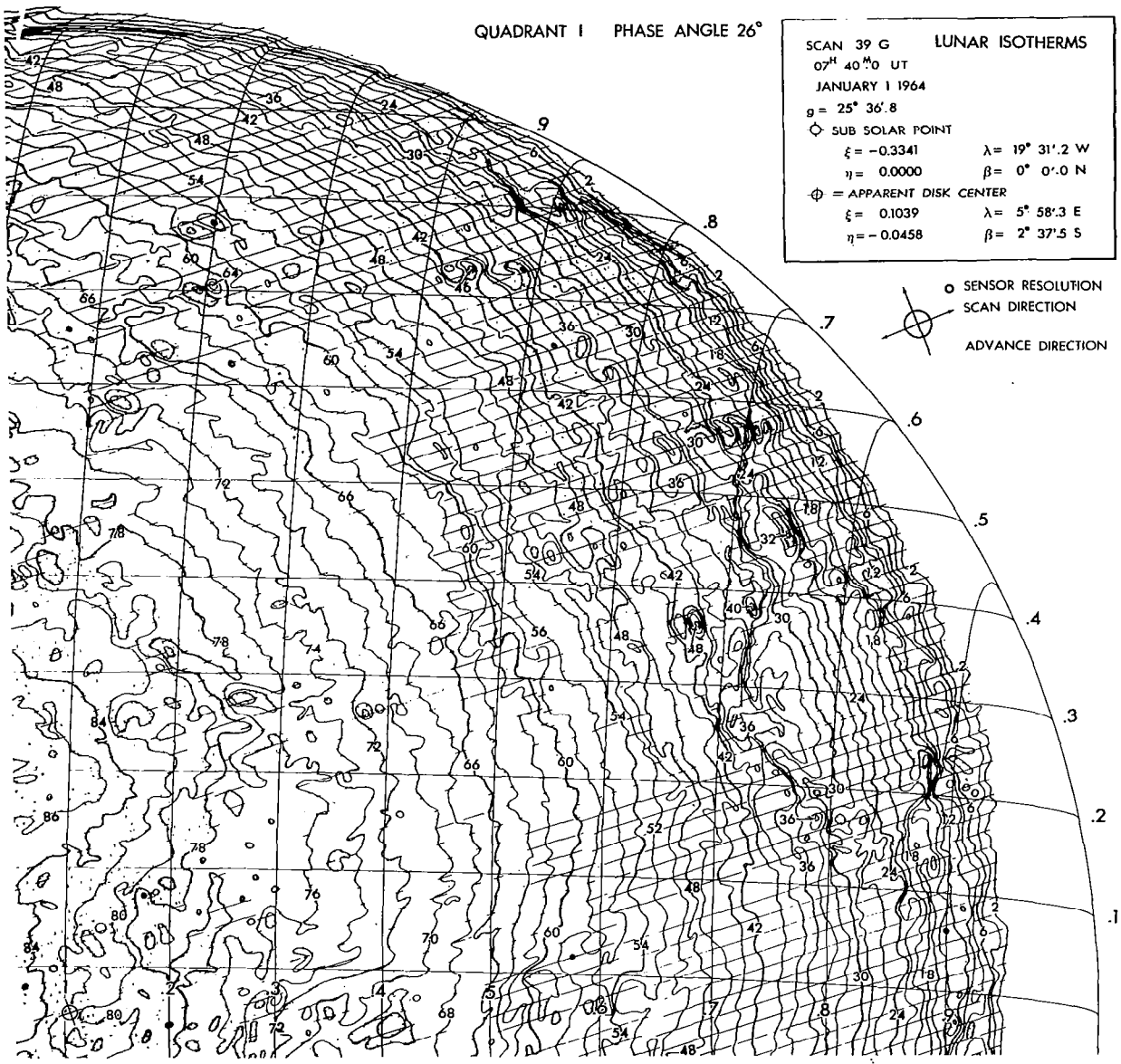
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	185.2	34	307.4	51	339.0	67	364.1	83	386.3
4	205.2	36	311.5	52	340.7	68	365.5	84	387.6
6	219.1	*37	313.5	53	342.4	69	367.0	85	388.9
8	230.1	38	315.5	54	344.0	70	368.4	86	390.2
10	239.4	39	317.5	55	345.6	71	369.8	87	391.5
12	247.6	40	319.4	56	347.2	72	371.3	88	392.8
14	255.0	41	321.3	57	348.8	73	372.7	89	394.1
16	261.7	42	323.2	58	350.4	74	374.1	90	395.4
18	268.0	43	325.0	59	352.0	75	375.5	91	396.7
20	273.8	44	326.8	60	353.5	76	376.8	92	397.9
22	279.3	45	328.6	61	355.1	77	378.2	93	399.2
24	284.5	46	330.4	62	356.6	78	379.6	94	400.4
26	289.5	47	332.2	63	358.1	79	380.9	95	401.7
28	294.2	48	333.9	64	359.6	80	382.3	96	402.9
30	298.8	49	335.6	65	361.1	81	383.6	97	404.2
32	303.2	50	337.3	66	362.6	82	385.0		

*Note change in levels contoured from Number 37 on.



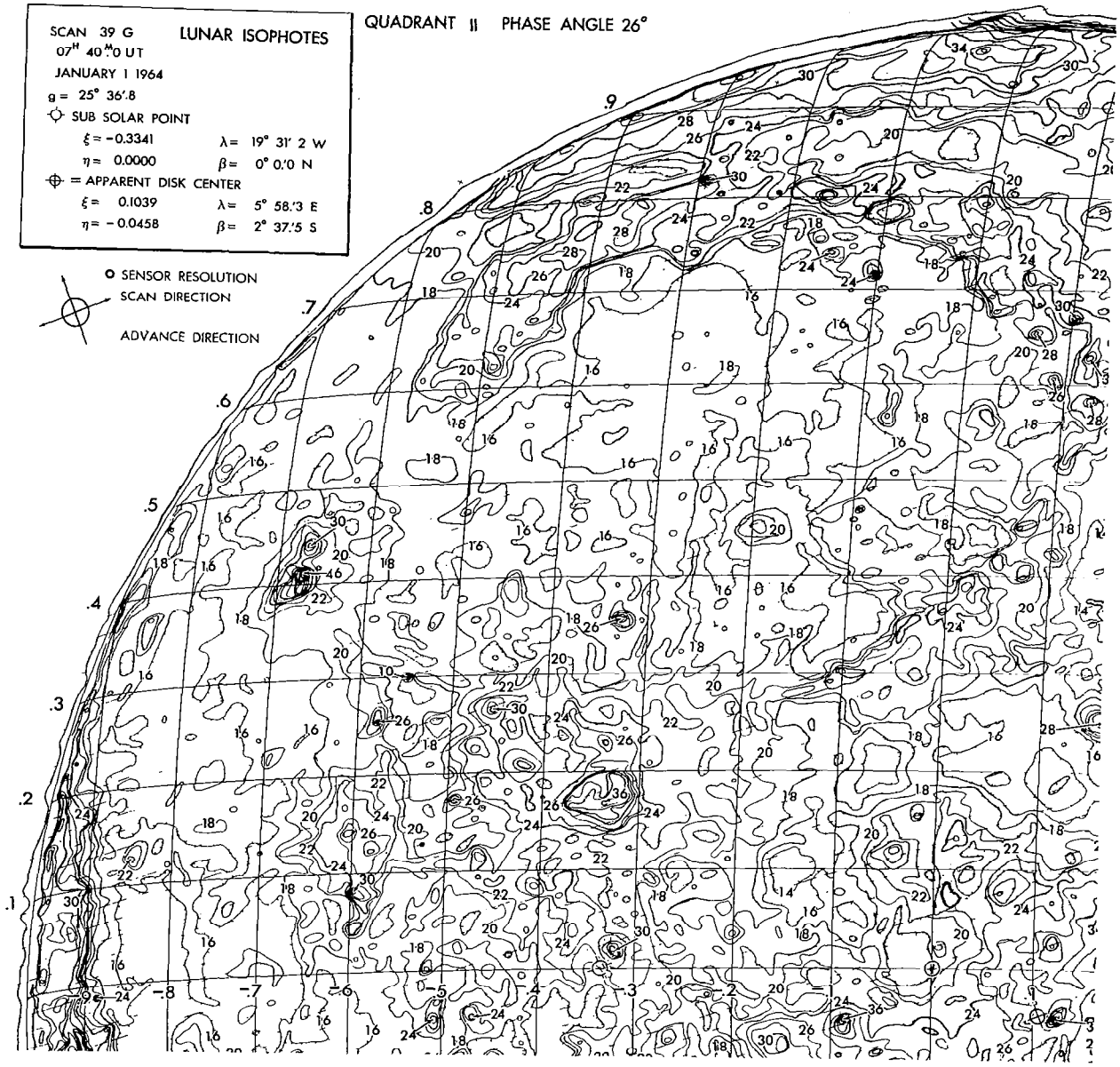
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.50	34	49.52
4	4.50	36	52.52
6	7.50	38	55.52
8	10.50	40	58.52
10	13.50	42	61.52
12	16.51	44	64.52
14	19.51	46	67.52
16	22.51	48	70.52
18	25.51	50	73.53
20	28.51	52	76.53
22	31.51	54	79.53
24	34.51	56	82.53
26	37.51	58	84.53
28	40.51		
30	43.52		
32	46.52		



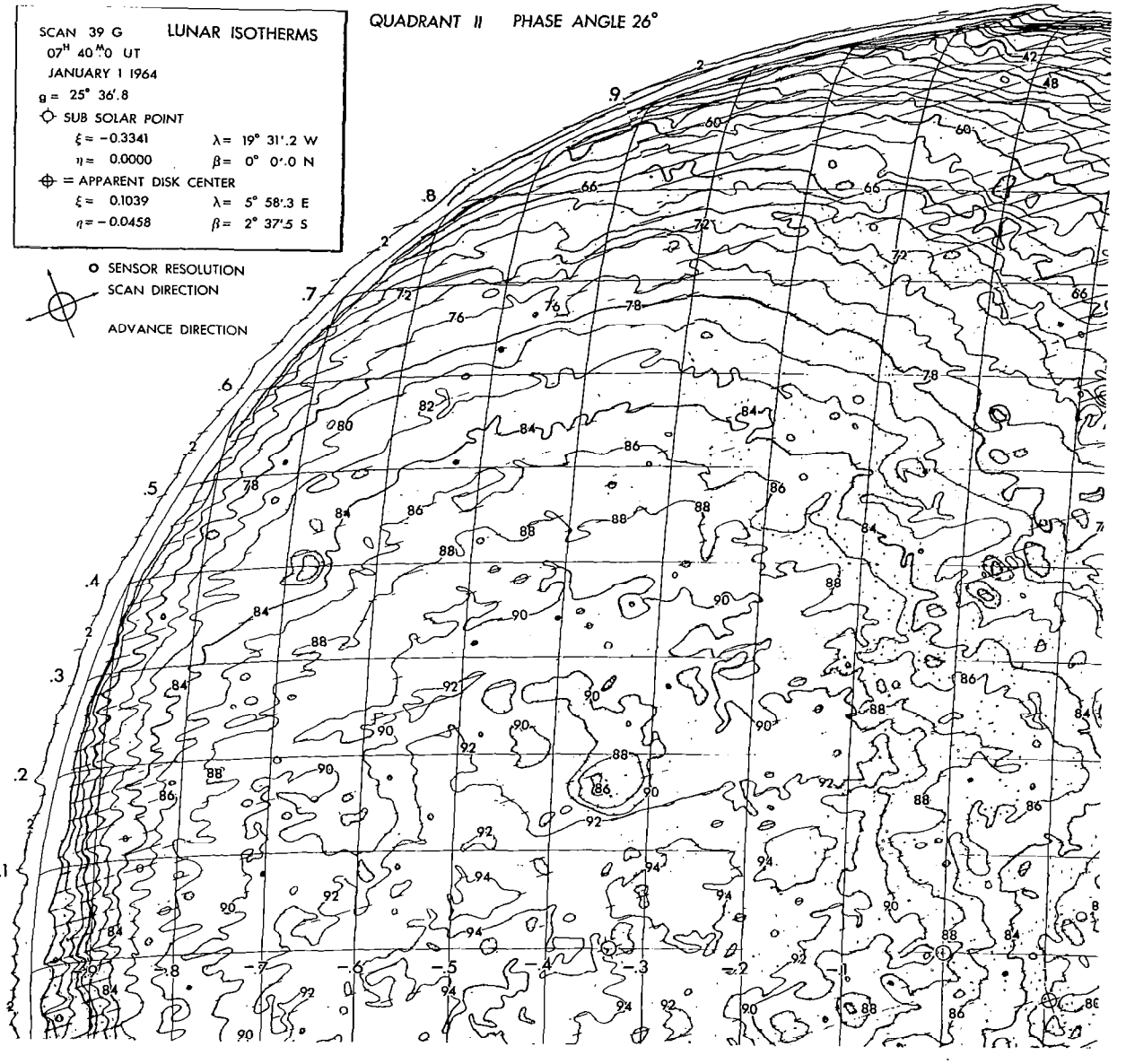
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	184.2	34	304.6	66	358.7
4	204.0	36	308.6	68	361.6
6	217.6	38	312.6	70	364.4
8	228.5	40	316.4	72	367.2
10	237.7	42	320.1	74	370.0
12	245.8	44	323.7	76	372.7
14	253.0	46	327.2	78	375.4
16	259.7	48	330.6	80	378.0
18	265.8	50	334.0	82	380.7
20	271.5	52	337.3	84	383.3
22	277.0	54	340.5	86	385.8
24	282.1	56	343.7	88	388.4
26	287.0	58	346.8	90	390.9
28	291.6	60	349.9	92	393.3
30	296.1	62	352.9	94	395.8
32	300.4	64	355.8	96	398.2



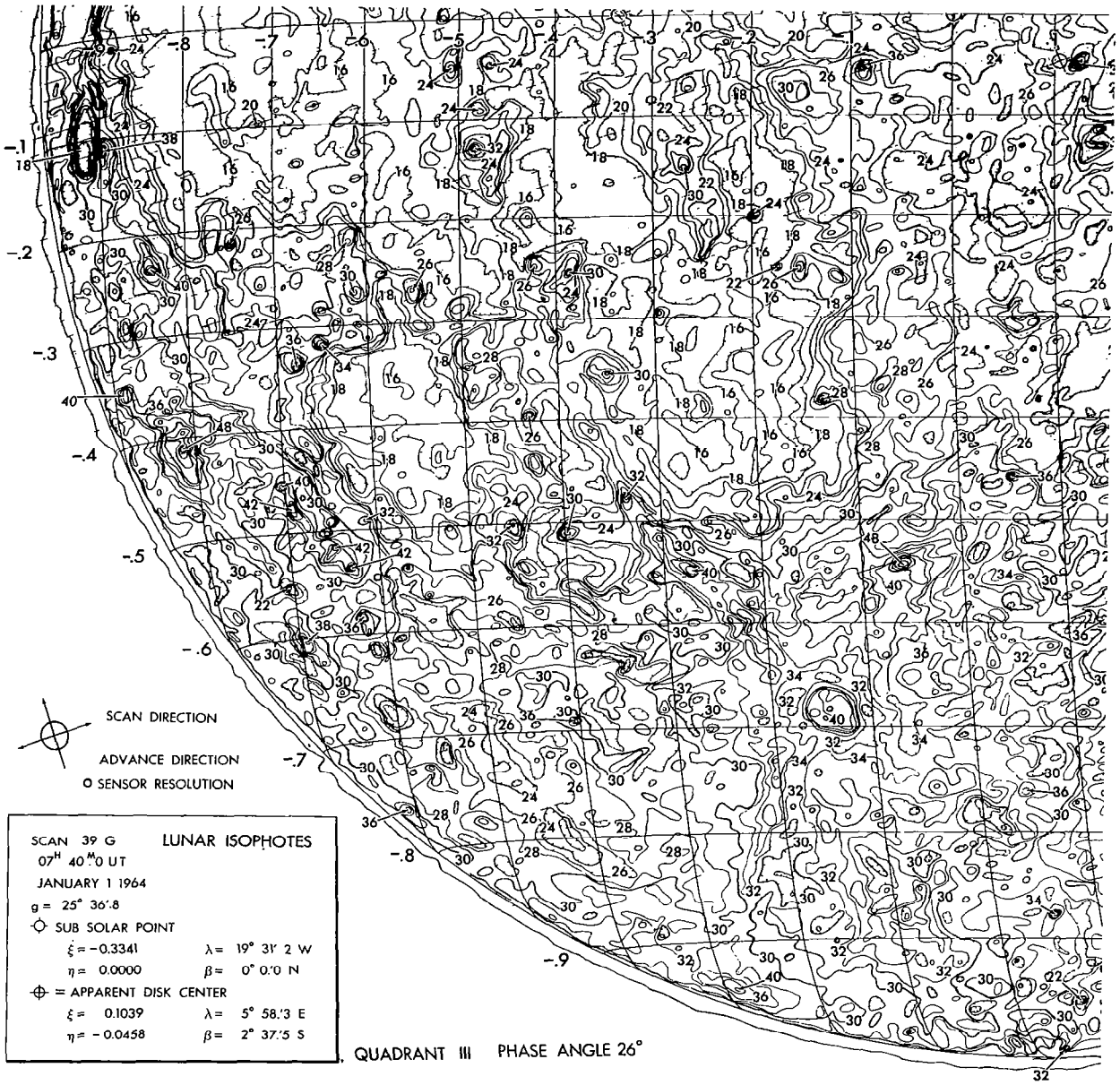
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.50	34	49.52
4	4.50	36	52.52
6	7.50	38	55.52
8	10.50	40	58.52
10	13.50	42	61.52
12	16.51	44	64.52
14	19.51	46	67.52
16	22.51	48	70.52
18	25.51	50	73.53
20	28.51	52	76.53
22	31.51	54	79.53
24	34.51	56	82.53
26	37.51	58	84.53
28	40.51		
30	43.52		
32	46.52		



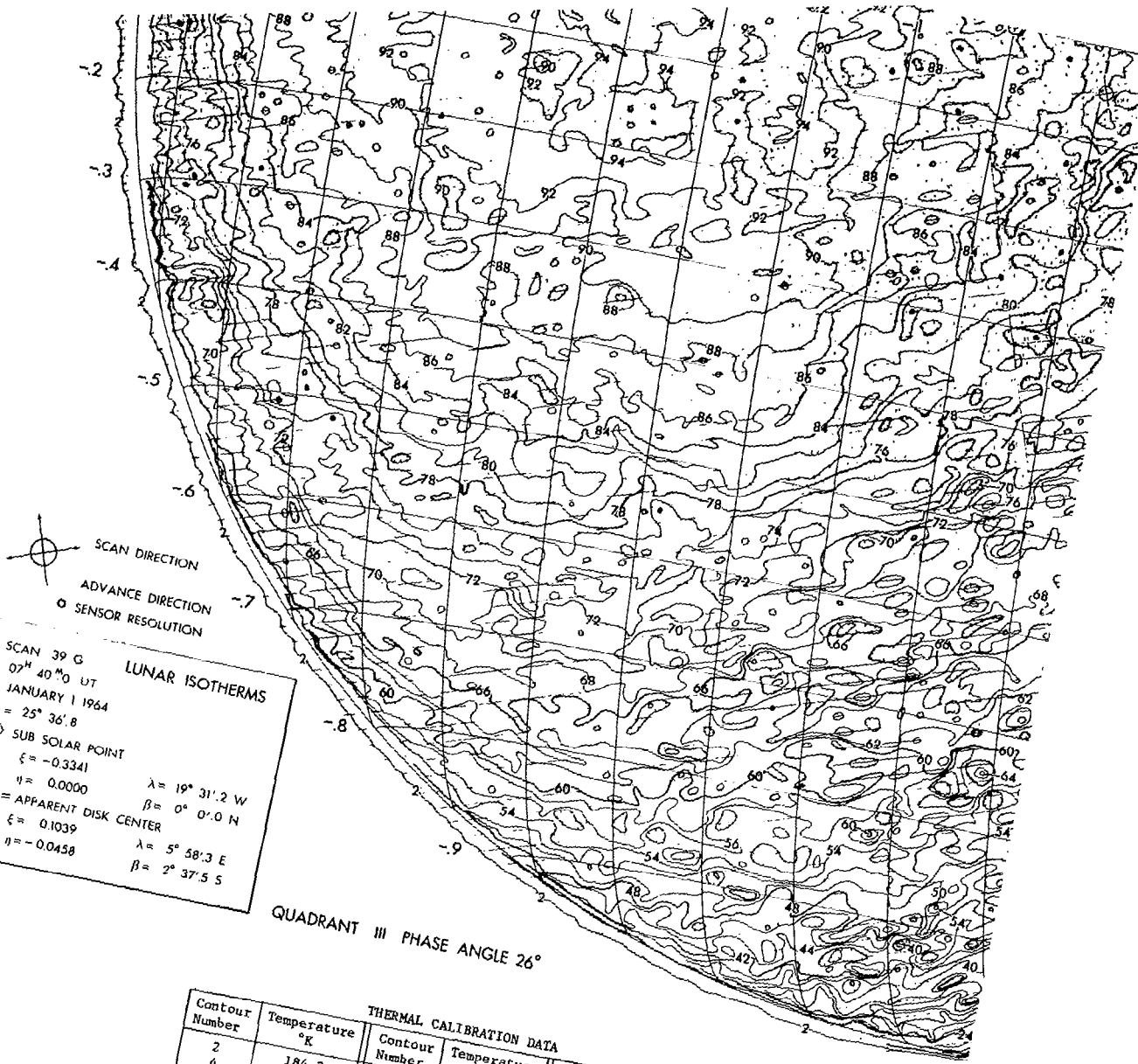
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	184.2	34	304.6	66	358.7
4	204.0	36	308.6	68	361.6
6	217.6	38	312.6	70	364.4
8	228.5	40	316.4	72	367.2
10	237.7	42	320.1	74	370.0
12	245.8	44	323.7	76	372.7
14	253.0	46	327.2	78	375.4
16	259.7	48	330.6	80	378.0
18	265.8	50	334.0	82	380.7
20	271.5	52	337.3	84	383.3
22	277.0	54	340.5	86	385.8
24	282.1	56	343.7	88	388.4
26	287.0	58	346.8	90	390.9
28	291.6	60	349.9	92	393.3
30	296.1	62	352.9	94	395.8
32	300.4	64	355.8	96	398.2



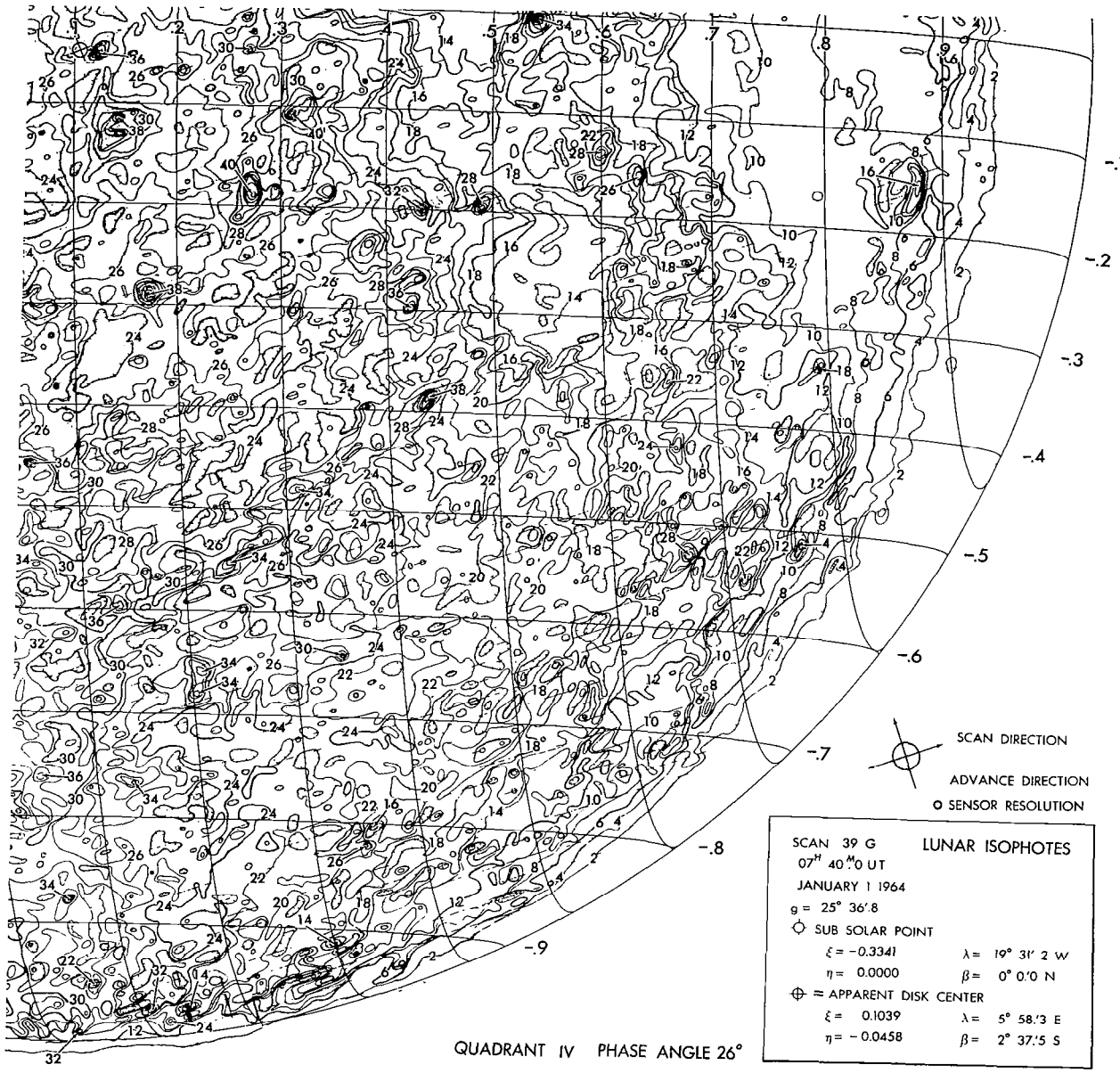
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.50	34	49.52
4	4.50	36	52.52
6	7.50	38	55.52
8	10.50	40	58.52
10	13.50	42	61.52
12	16.51	44	64.52
14	19.51	46	67.52
16	22.51	48	70.52
18	25.51	50	73.53
20	28.51	52	76.53
22	31.51	54	79.53
24	34.51	56	82.53
26	37.51	58	84.53
28	40.51		
30	43.52		
32	46.52		



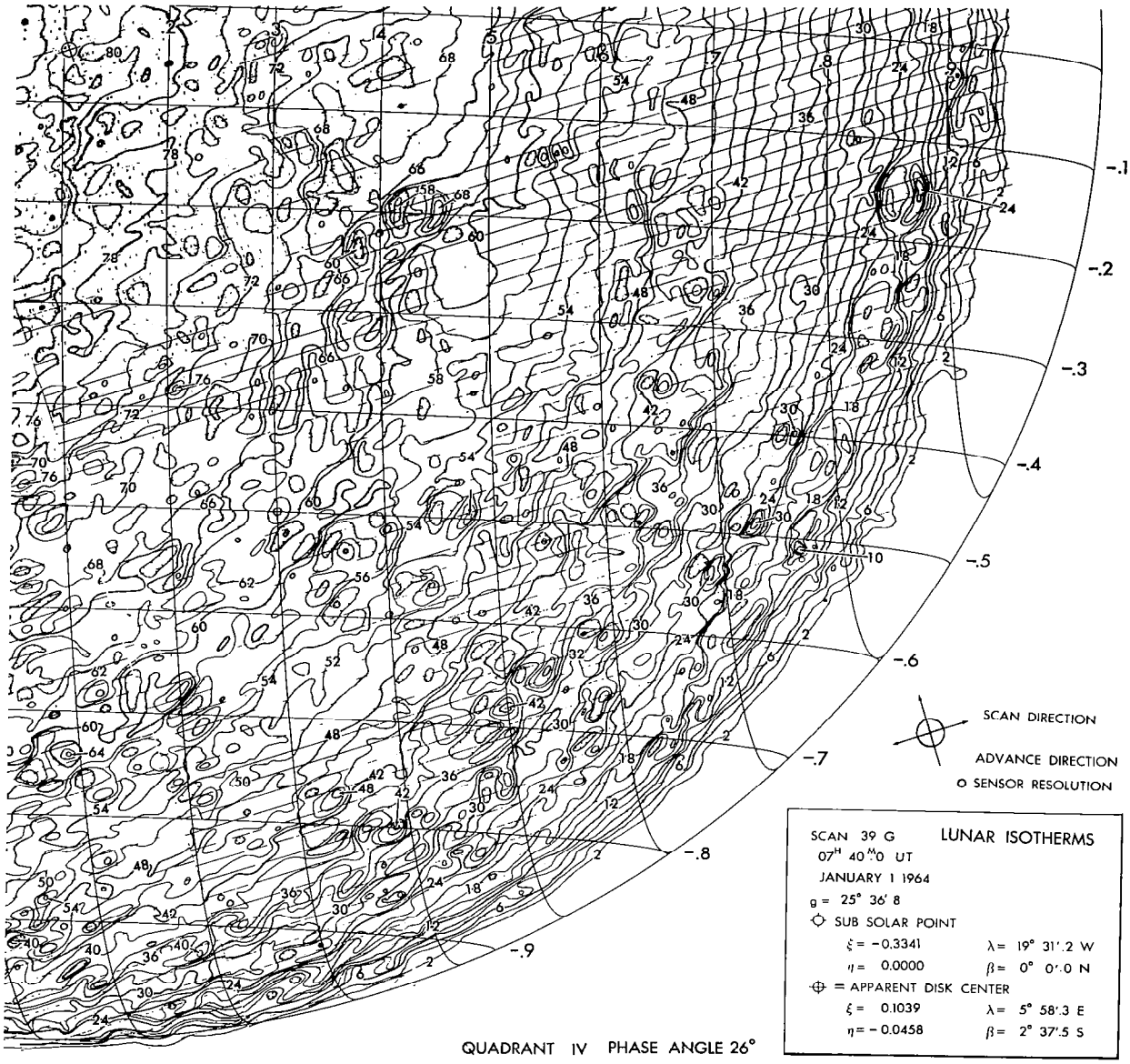
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2		34	304.6	66	358.7
4	184.2	36	308.6	68	361.6
6	204.0	38	312.6	70	364.4
8	217.6	40	316.4	72	367.2
10	228.5	42	320.1	74	370.0
12	237.7	44	323.7	76	372.7
14	245.8	46	327.2	78	375.4
16	253.0	48	330.6	80	378.0
18	259.7	50	334.0	82	380.7
20	265.8	52	337.3	84	383.3
22	271.5	54	340.5	86	385.8
24	277.0	56	343.7	88	388.4
26	282.1	58	346.8	90	390.9
28	287.0	60	349.9	92	393.3
30	291.6	62	352.9	94	395.8
32	296.1	64	355.8	96	398.2
	300.4				



BRIGHTNESS CALIBRATION DATA

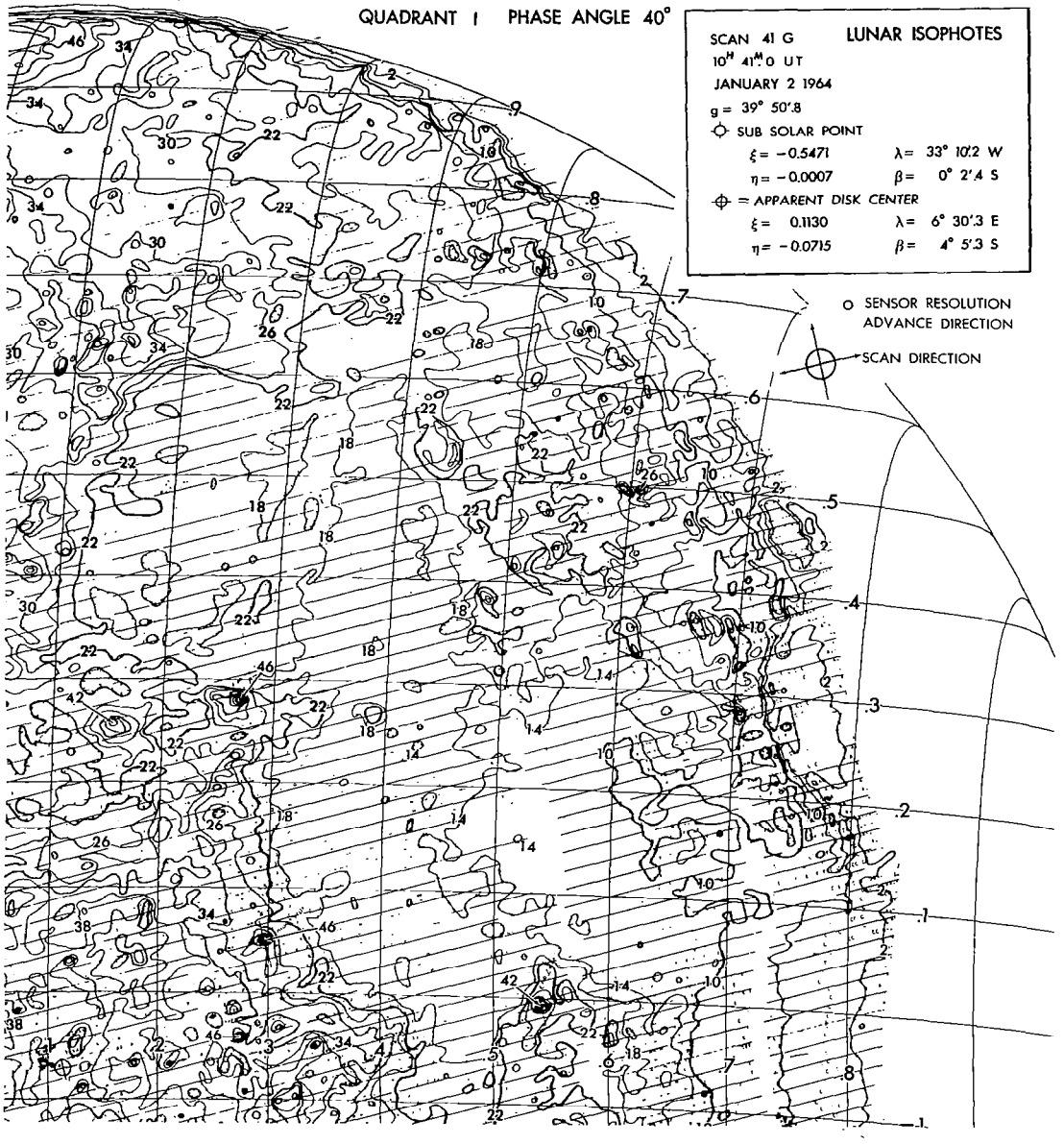
Contour Number	Brightness Value b	Contour Number	Brightness Value b
2	1.50	34	49.52
4	4.50	36	52.52
6	7.50	38	55.52
8	10.50	40	58.52
10	13.50	42	61.52
12	16.51	44	64.52
14	19.51	46	67.52
16	22.51	48	70.52
18	25.51	50	73.53
20	28.51	52	76.53
22	31.51	54	79.53
24	34.51	56	82.53
26	37.51	58	84.53
28	40.51		
30	43.52		
32	46.52		



QUADRANT IV PHASE ANGLE 26°

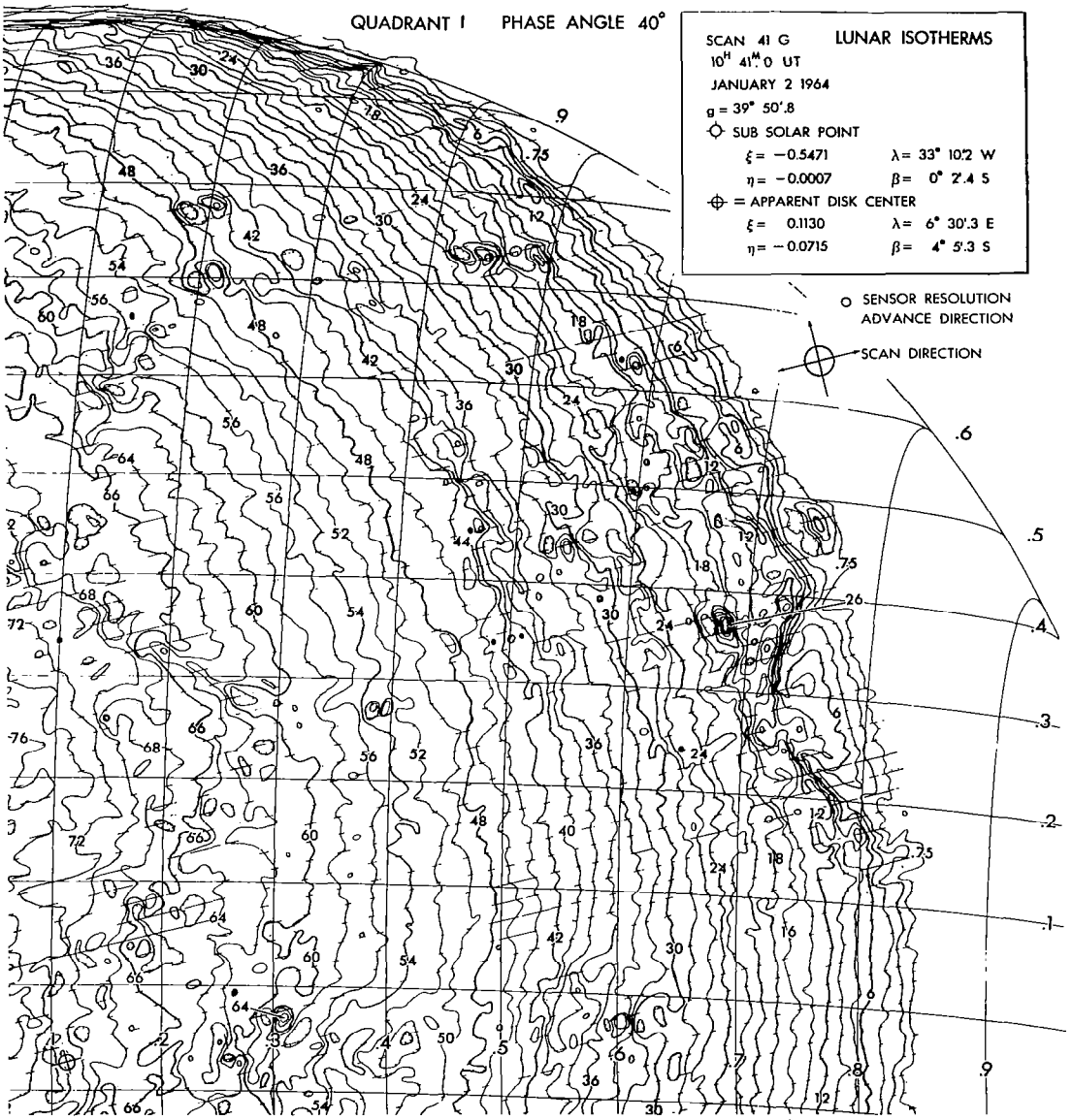
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	184.2	34	304.6	66	358.7
4	204.0	36	308.6	68	361.6
6	217.6	38	312.6	70	364.4
8	228.5	40	316.4	72	367.2
10	237.7	42	320.1	74	370.0
12	245.8	44	323.7	76	372.7
14	253.0	46	327.2	78	375.4
16	259.7	48	330.6	80	378.0
18	265.8	50	334.0	82	380.7
20	271.5	52	337.3	84	383.3
22	277.0	54	340.5	86	385.8
24	282.1	56	343.7	88	388.4
26	287.0	58	346.8	90	390.9
28	291.6	60	349.9	92	393.3
30	296.1	62	352.9	94	395.8
32	300.4	64	355.8	96	398.2



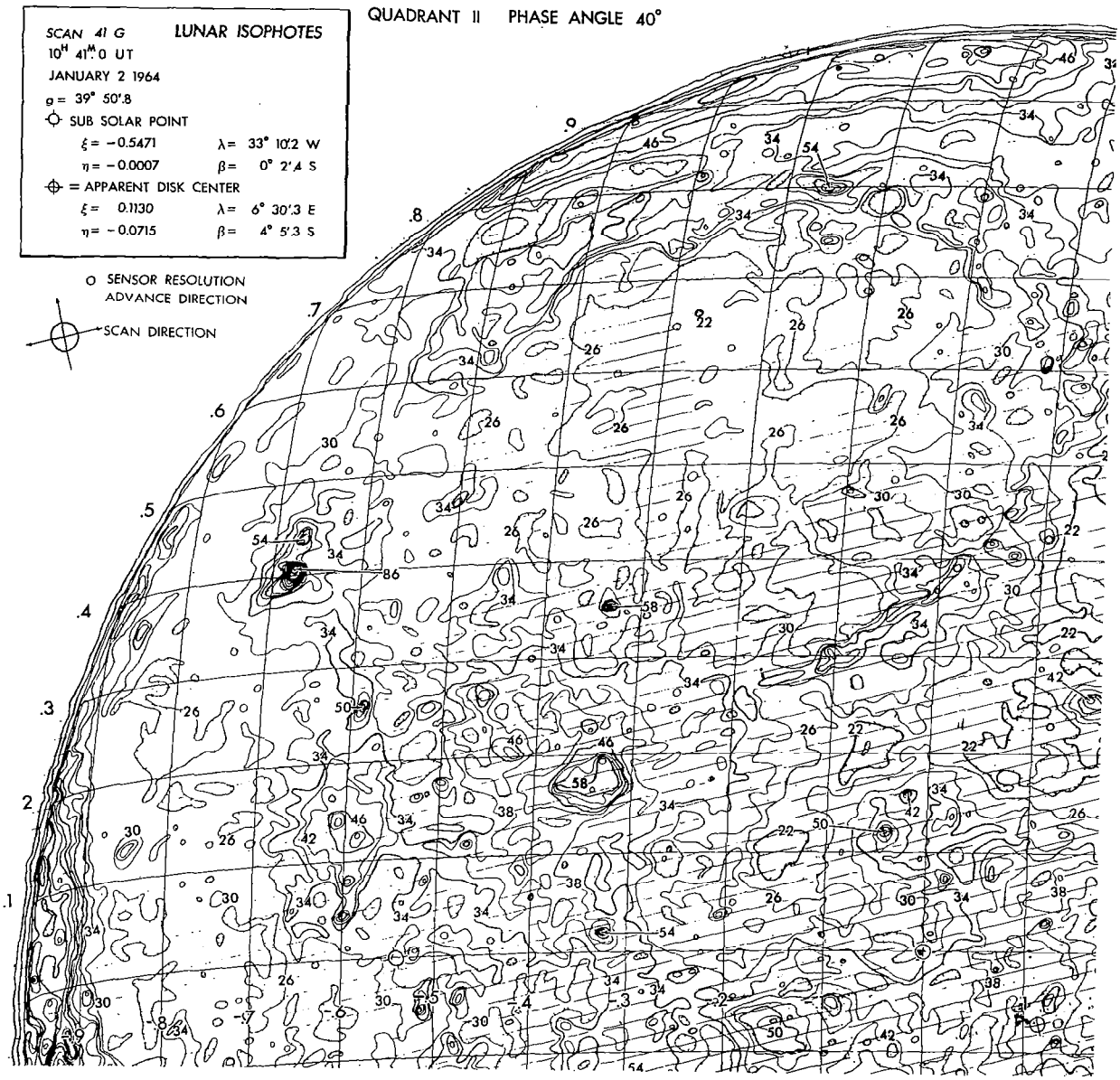
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.75	.52	60	41.51
1	.69	64	44.27
4	2.77	68	47.04
8	5.53	72	49.81
12	8.30	76	52.57
16	11.07	80	55.34
20	13.84	84	58.11
24	16.60	88	60.88
28	19.37	92	63.64
32	22.14	96	66.41
36	24.90	100	69.18
40	27.67		
44	30.44		
48	33.21		
52	35.97		
56	38.74		



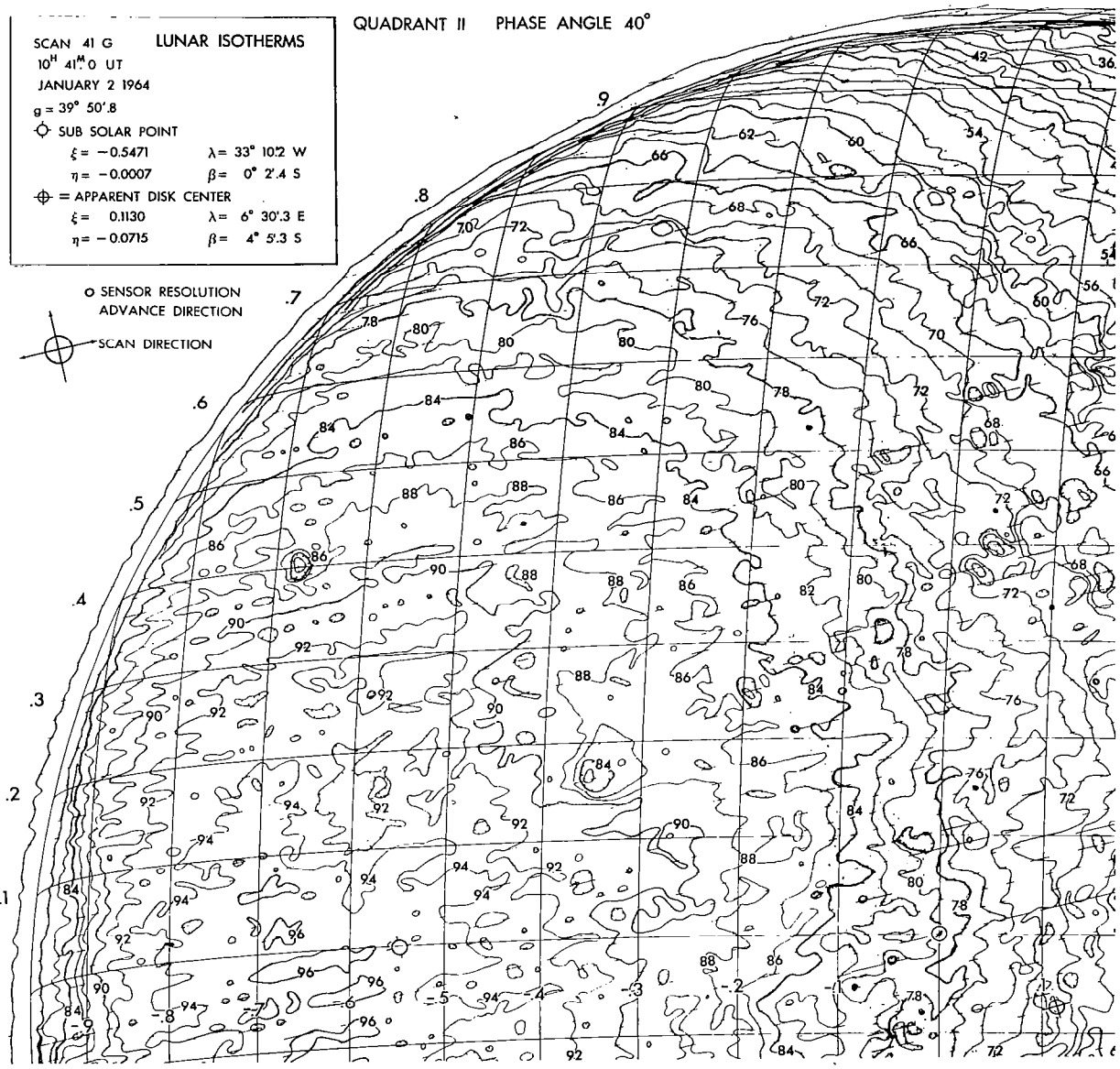
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.4	32	298.5	64	353.1	96	394.9
2	183.4	34	302.6	66	356.0	98	397.3
4	203.1	36	306.6	68	358.8		
6	216.6	38	310.5	70	361.6		
8	227.4	40	314.2	72	364.4		
10	236.5	42	317.9	74	367.1		
12	244.5	44	321.4	76	369.8		
14	251.6	46	324.9	78	372.4		
16	258.2	48	328.3	80	375.0		
18	264.3	50	331.6	82	377.6		
20	270.0	52	334.9	84	380.2		
22	275.3	54	338.1	86	382.7		
24	280.4	56	341.2	88	385.2		
26	285.2	58	344.2	90	387.6		
28	289.8	60	347.3	92	390.1		
30	294.2	62	350.2	94	392.5		



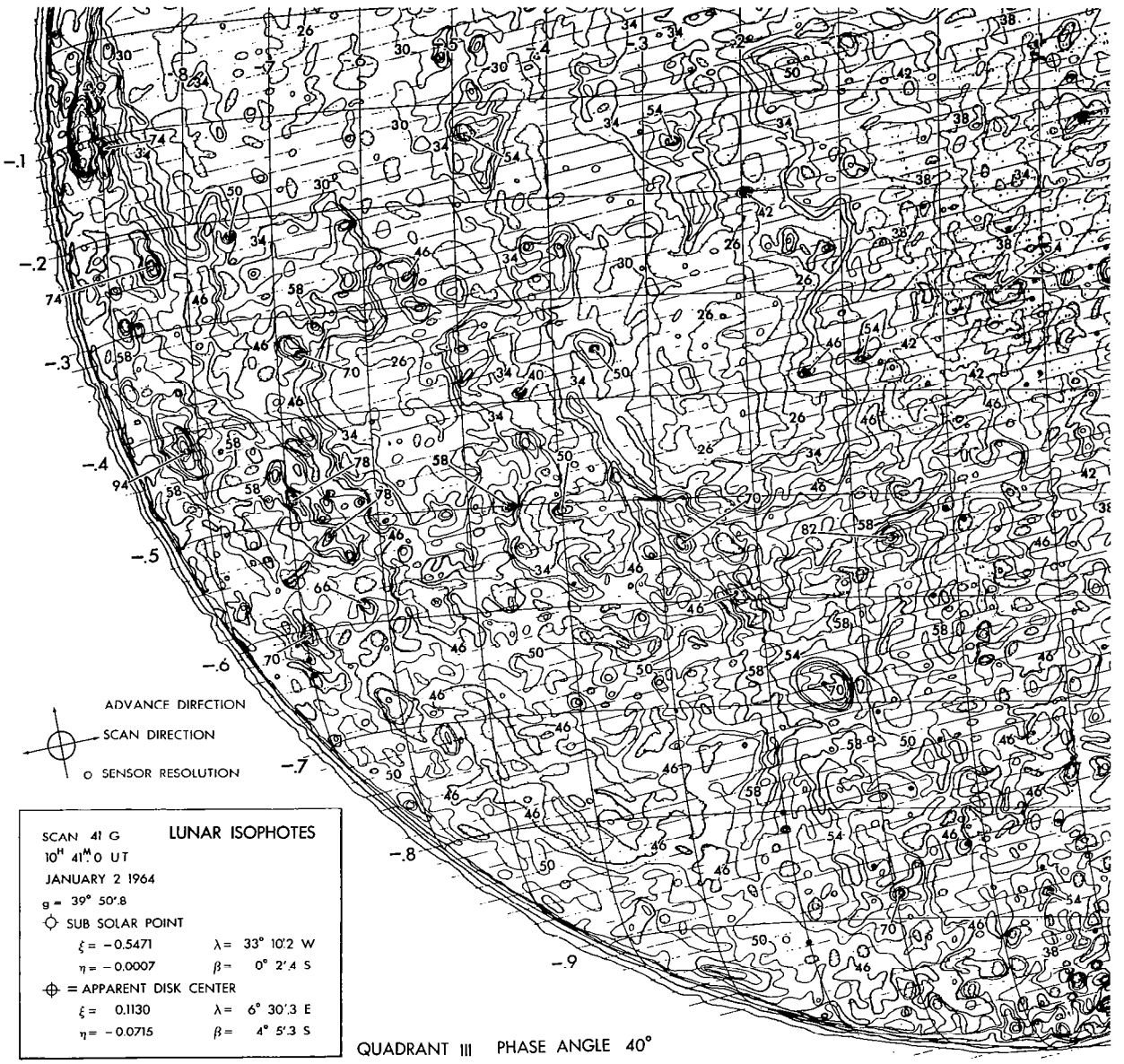
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.75	.52	60	41.51
1	.69	64	44.27
4	2.77	68	47.04
8	5.53	72	49.81
12	8.30	76	52.57
16	11.07	80	55.34
20	13.84	84	58.11
24	16.60	88	60.88
28	19.37	92	63.64
32	22.14	96	66.41
36	24.90	100	69.18
40	27.67		
44	30.44		
48	33.21		
52	35.97		
56	38.74		



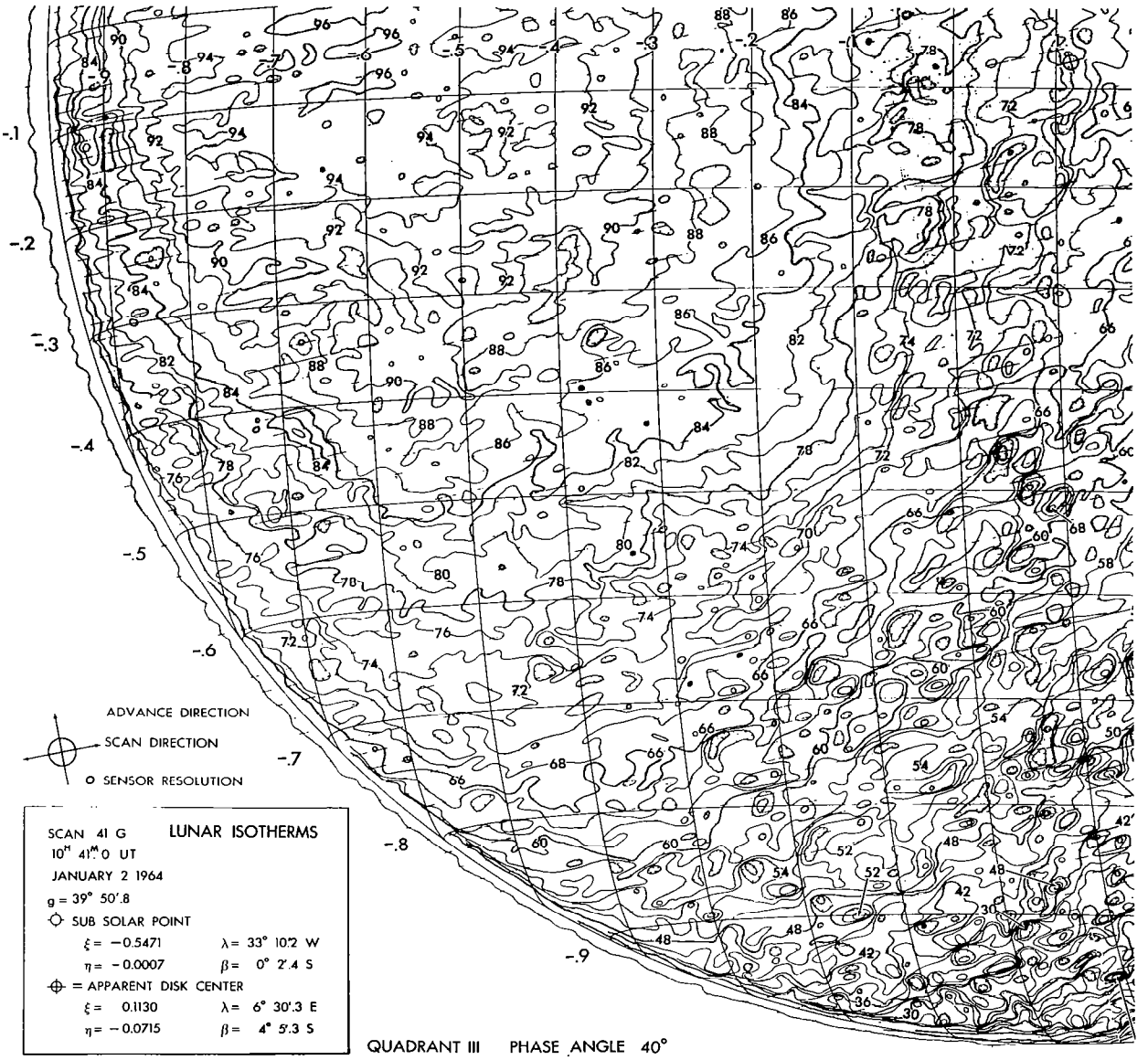
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.4	32	298.5	64	353.1	96	394.9
2	183.4	34	302.6	66	356.0	98	397.3
4	203.1	36	306.6	68	358.8		
6	216.6	38	310.5	70	361.6		
8	227.4	40	314.2	72	364.4		
10	236.5	42	317.9	74	367.1		
12	244.5	44	321.4	76	369.8		
14	251.6	46	324.9	78	372.4		
16	258.2	48	328.3	80	375.0		
18	264.3	50	331.6	82	377.6		
20	270.0	52	334.9	84	380.2		
22	275.3	54	338.1	86	382.7		
24	280.4	56	341.2	88	385.2		
26	285.2	58	344.2	90	387.6		
28	289.8	60	347.3	92	390.1		
30	294.2	62	350.2	94	392.5		



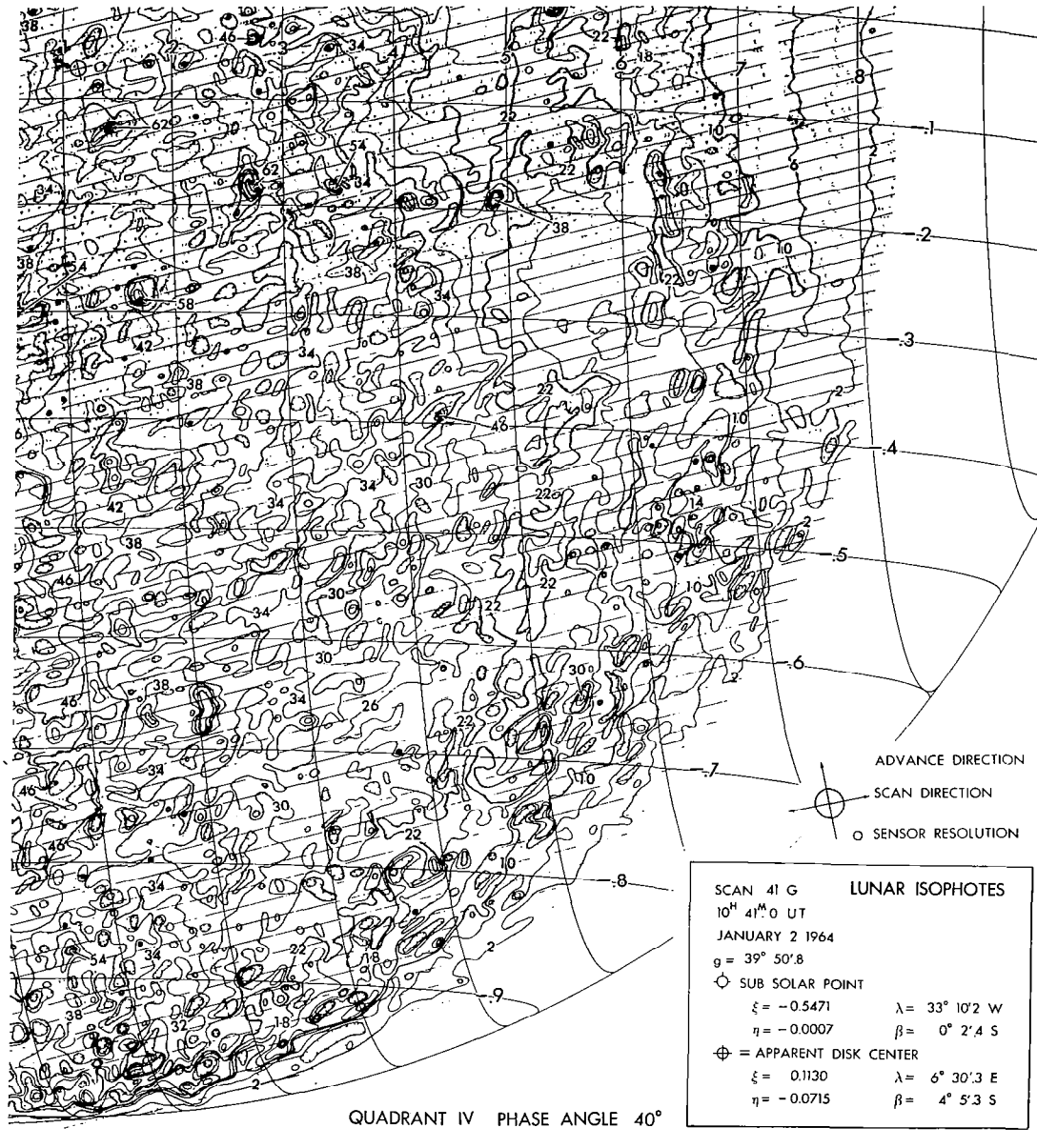
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.75	.52	60	41.51
1	.69	64	44.27
4	2.77	68	47.04
8	5.53	72	49.81
12	8.30	76	52.57
16	11.07	80	55.34
20	13.84	84	58.11
24	16.60	88	60.88
28	19.37	92	63.64
32	22.14	96	66.41
36	24.90	100	69.18
40	27.67		
44	30.44		
48	33.21		
52	35.97		
56	38.74		



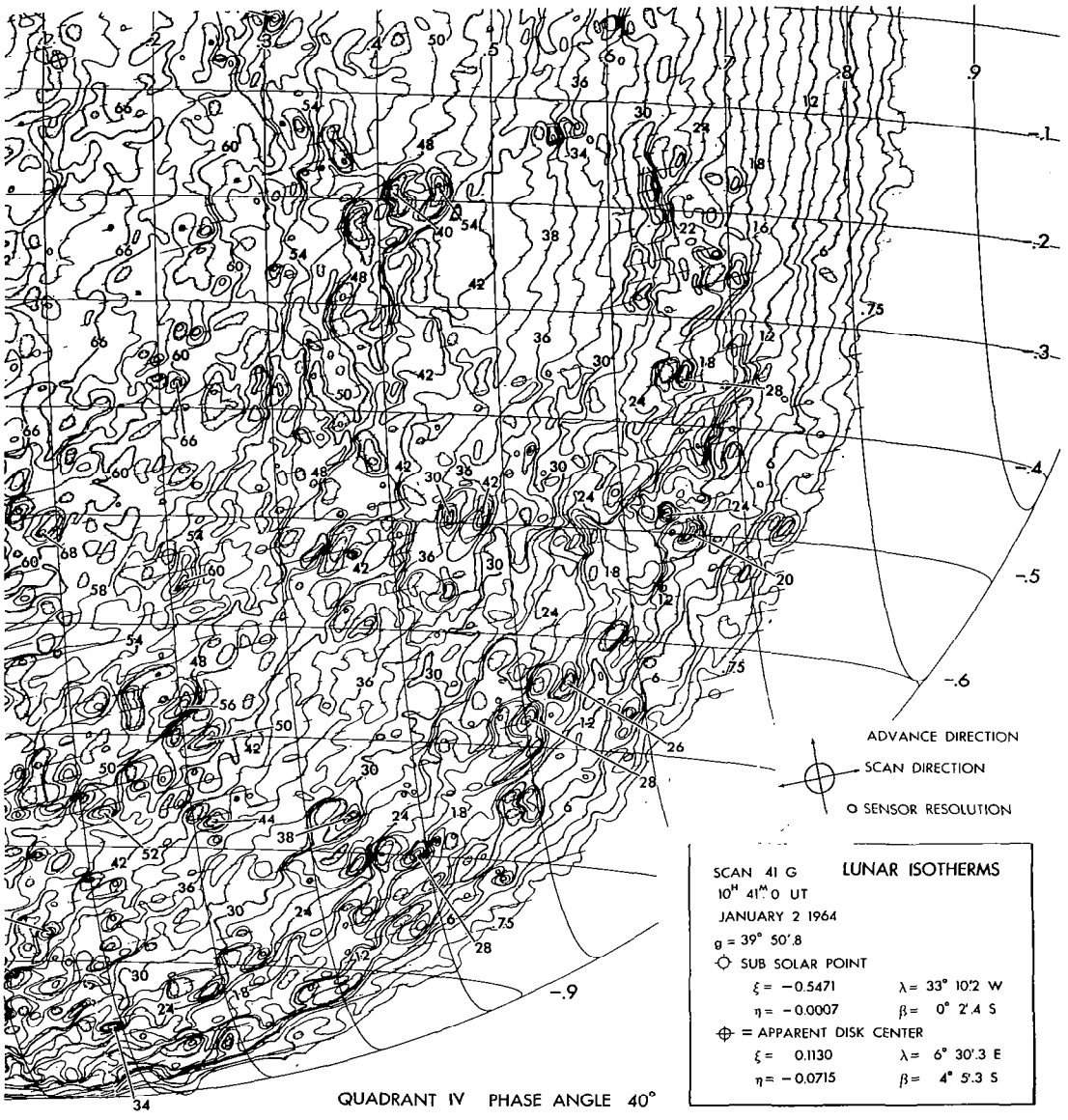
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.4	32	298.5	64	353.1	96	394.9
2	183.4	34	302.6	66	356.0	98	397.3
4	203.1	36	306.6	68	358.8		
6	216.6	38	310.5	70	361.6		
8	227.4	40	314.2	72	364.4		
10	236.5	42	317.9	74	367.1		
12	244.5	44	321.4	76	369.8		
14	251.6	46	324.9	78	372.4		
16	258.2	48	328.3	80	375.0		
18	264.3	50	331.6	82	377.6		
20	270.0	52	334.9	84	380.2		
22	275.3	54	338.1	86	382.7		
24	280.4	56	341.2	88	385.2		
26	285.2	58	344.2	90	387.6		
28	289.8	60	347.3	92	390.1		
30	294.2	62	350.2	94	392.5		



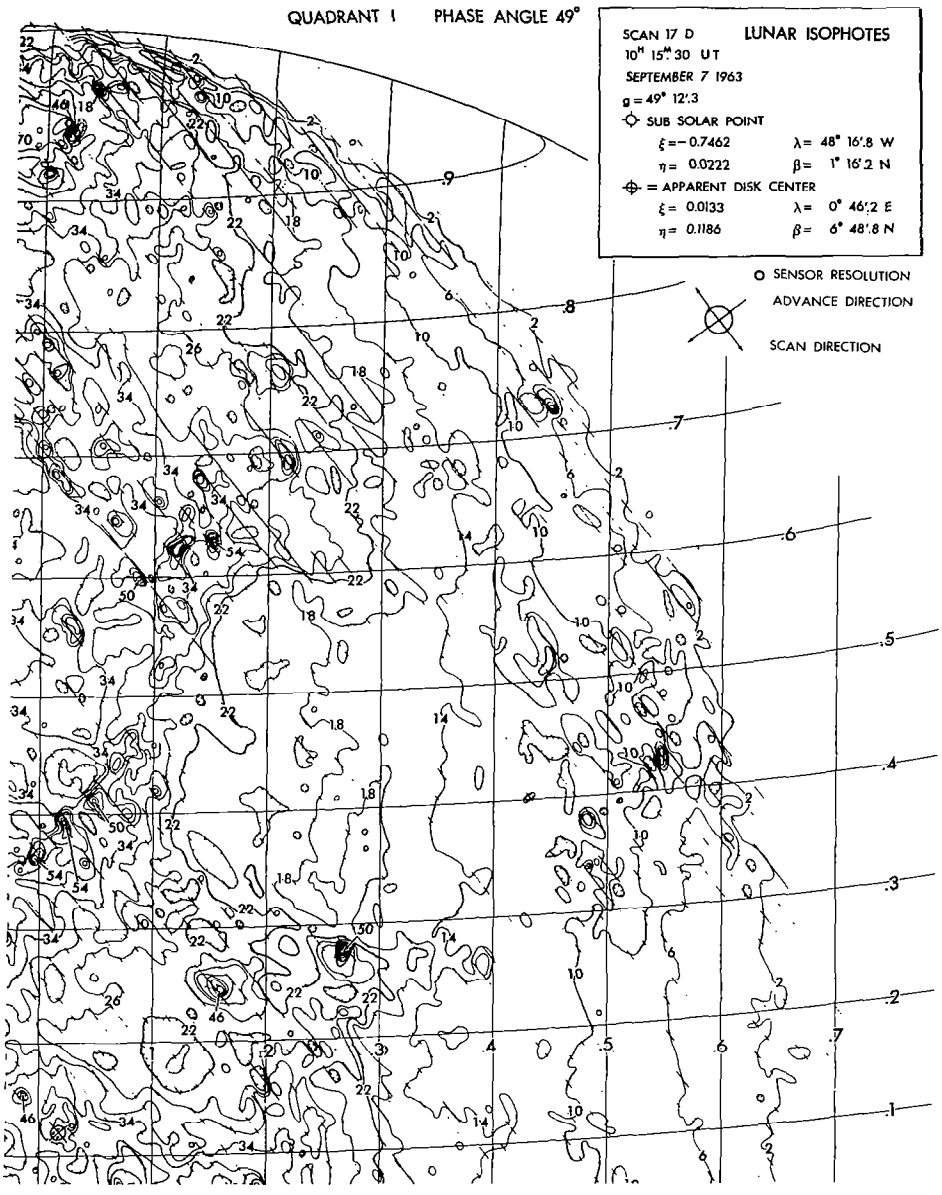
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b
.75	.52	60	41.51
1	.69	64	44.27
4	2.77	68	47.04
8	5.53	72	49.81
12	8.30	76	52.57
16	11.07	80	55.34
20	13.84	84	58.11
24	16.60	88	60.88
28	19.37	92	63.64
32	22.14	96	66.41
36	24.90	100	69.18
40	27.67		
44	30.44		
48	33.21		
52	35.97		
56	38.74		



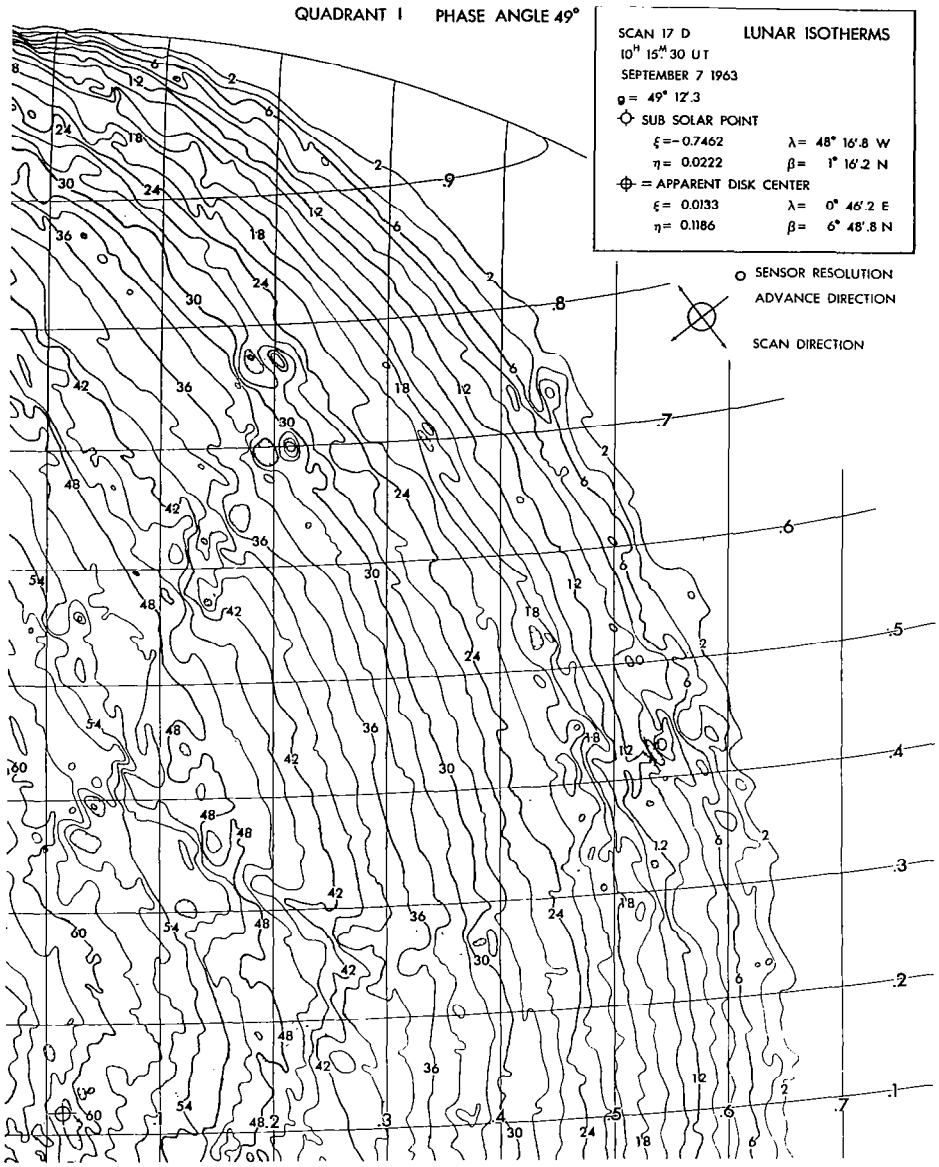
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	161.4	32	298.5	64	353.1	96	394.9
2	183.4	34	302.6	66	356.0	98	397.3
4	203.1	36	306.6	68	358.8		
6	216.6	38	310.5	70	361.6		
8	227.4	40	314.2	72	364.4		
10	236.5	42	317.9	74	367.1		
12	244.5	44	321.4	76	369.8		
14	251.6	46	324.9	78	372.4		
16	258.2	48	328.3	80	375.0		
18	264.3	50	331.6	82	377.6		
20	270.0	52	334.9	84	380.2		
22	275.3	54	338.1	86	382.7		
24	280.4	56	341.2	88	385.2		
26	285.2	58	344.2	90	387.6		
28	289.8	60	347.3	92	390.1		
30	294.2	62	350.2	94	392.5		



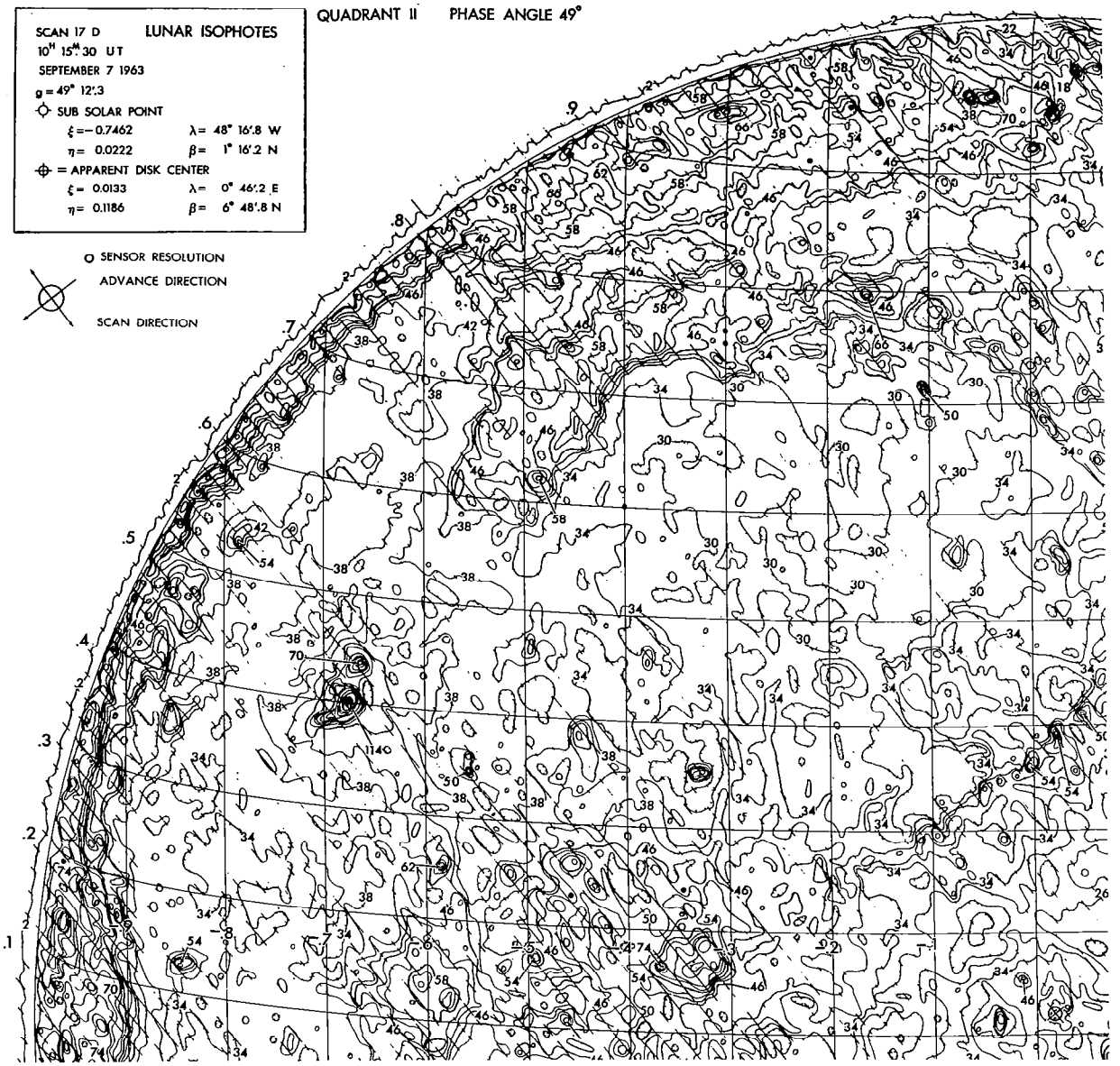
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	28.21	122	59.34
.75	.36	62	30.16	126	61.29
2	.97	66	32.10	130	63.23
6	2.92	70	34.05	134	65.18
10	4.86	74	35.99		
14	6.81	78	37.94		
18	8.76	82	39.88		
22	10.70	86	41.83		
26	12.65	90	43.78		
30	14.59	94	45.72		
34	16.54	98	47.67		
38	18.48	102	49.61		
42	20.43	106	51.56		
46	22.37	110	53.50		
50	24.32	114	55.45		
54	26.27	118	57.40		



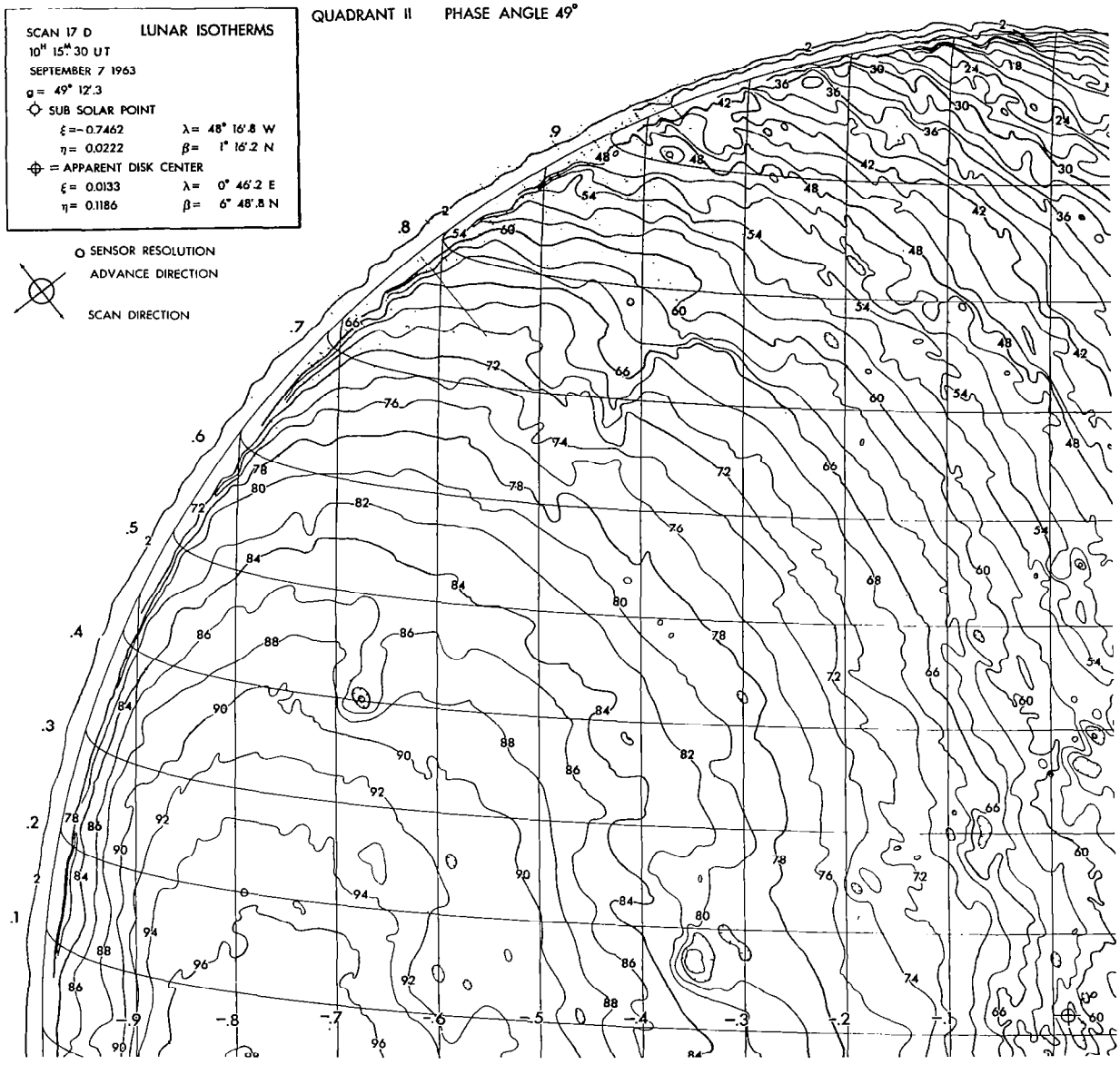
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.1	34	299.1	66	351.2	98	391.4
4	201.4	36	303.0	68	354.0	100	393.7
6	214.8	38	306.8	70	356.7		
8	225.3	40	310.4	72	359.4		
10	234.3	42	314.0	74	362.0		
12	242.1	44	317.5	76	364.6		
14	249.2	46	320.9	78	367.2		
16	255.6	48	324.2	80	369.7		
18	261.6	50	327.4	82	372.3		
20	267.1	52	330.6	84	374.7		
22	272.4	54	333.7	86	377.2		
24	277.3	56	336.7	88	379.6		
26	282.0	58	339.7	90	382.0		
28	286.6	60	342.7	92	384.4		
30	290.9	62	345.6	94	386.8		
32	295.1	64	348.4	96	389.1		



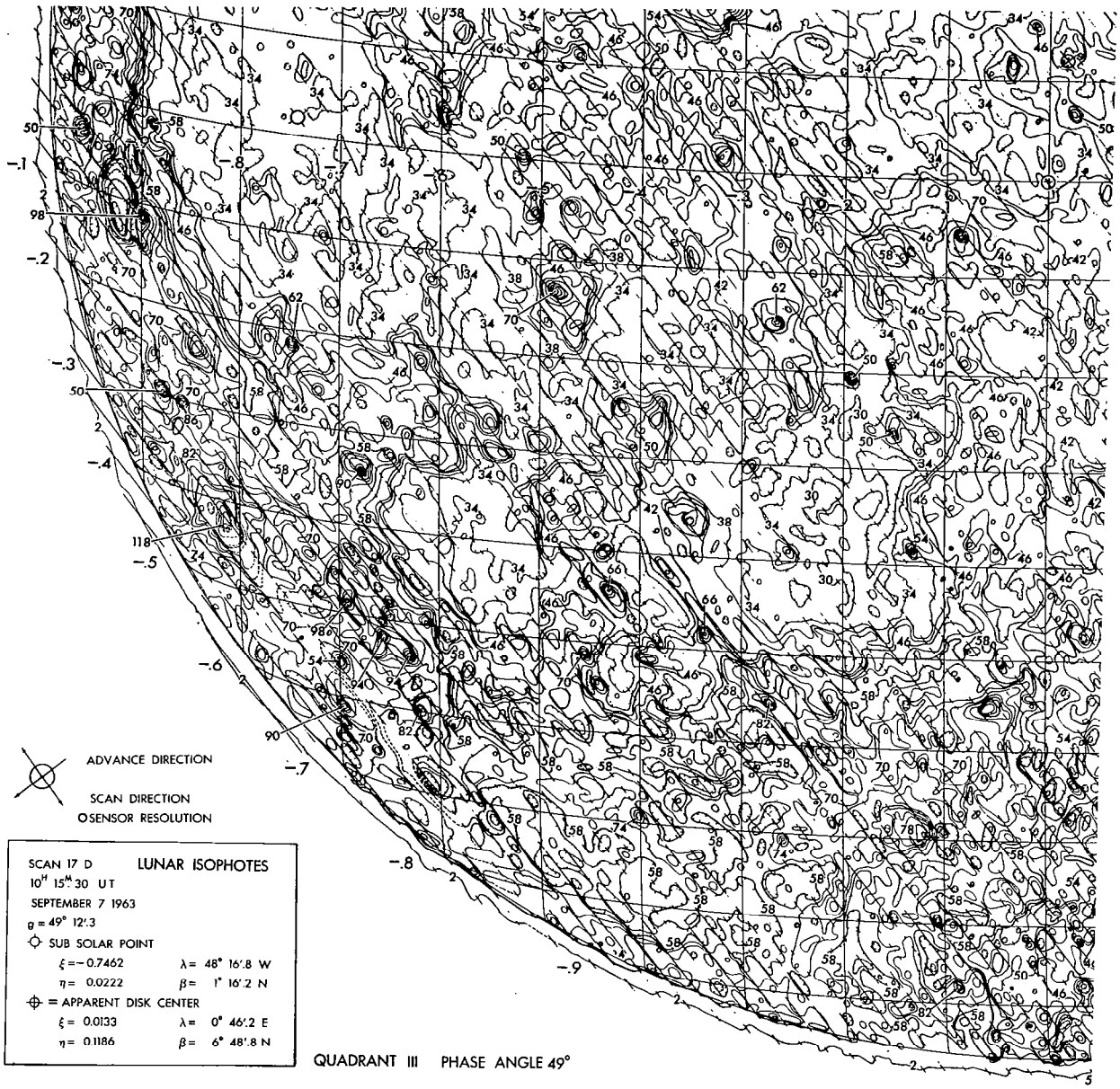
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	28.21	122	59.34
.75	.36	62	30.16	126	61.29
2	.97	66	32.10	130	63.23
6	2.92	70	34.05	134	65.18
10	4.86	74	35.99		
14	6.81	78	37.94		
18	8.76	82	39.88		
22	10.70	86	41.83		
26	12.65	90	43.78		
30	14.59	94	45.72		
34	16.54	98	47.67		
38	18.48	102	49.61		
42	20.43	106	51.56		
46	22.37	110	53.50		
50	24.32	114	55.45		
54	26.27	118	57.40		



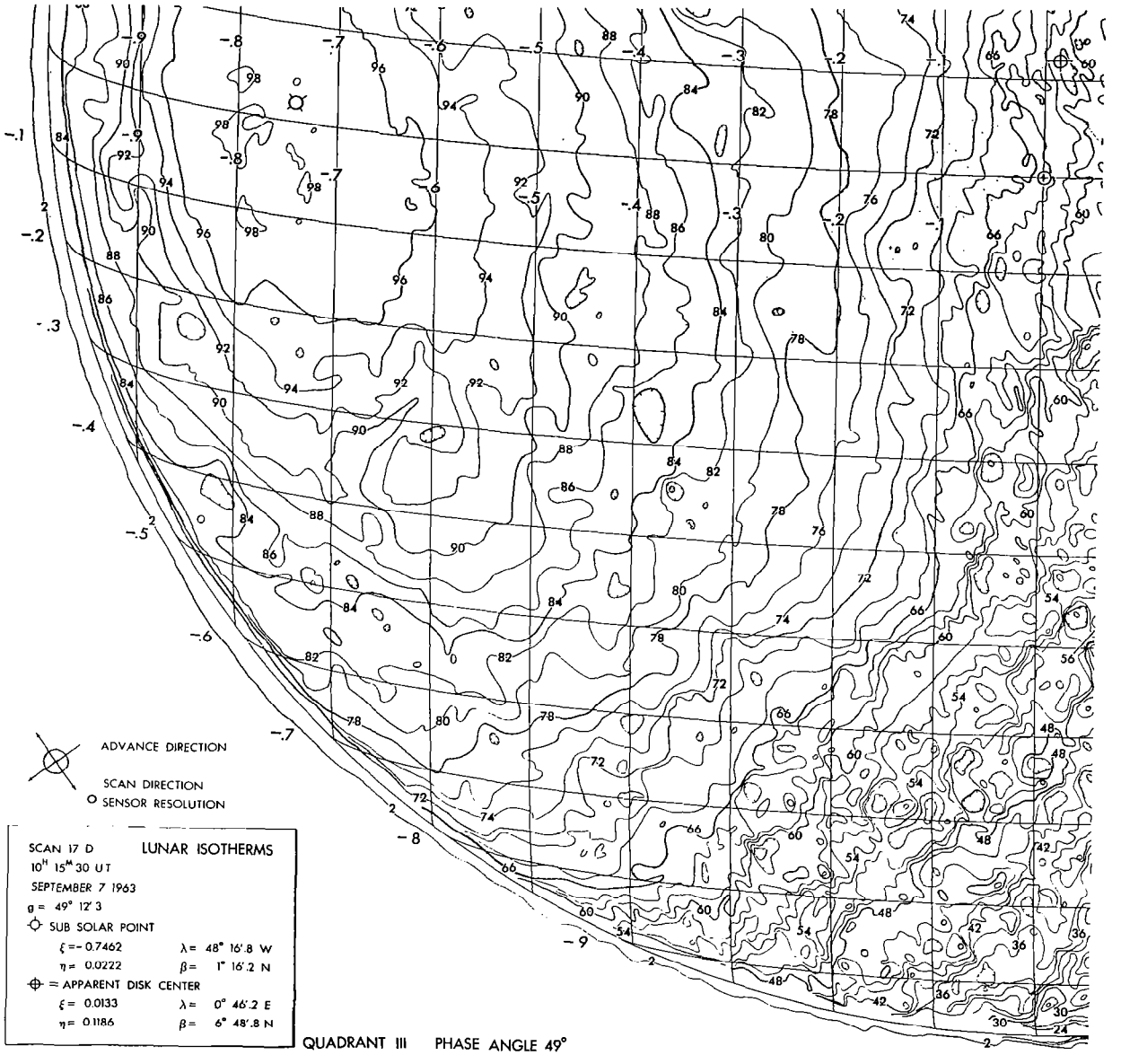
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.1	34	299.1	66	351.2	98	391.4
4	201.4	36	303.0	68	354.0	100	393.7
6	214.8	38	306.8	70	356.7		
8	225.3	40	310.4	72	359.4		
10	234.3	42	314.0	74	362.0		
12	242.1	44	317.5	76	364.6		
14	249.2	46	320.9	78	367.2		
16	255.6	48	324.2	80	369.7		
18	261.6	50	327.4	82	372.3		
20	267.1	52	330.6	84	374.7		
22	272.4	54	333.7	86	377.2		
24	277.3	56	336.7	88	379.6		
26	282.0	58	339.7	90	382.0		
28	286.6	60	342.7	92	384.4		
30	290.9	62	345.6	94	386.8		
32	295.1	64	348.4	96	389.1		



BRIGHTNESS CALIBRATION DATA

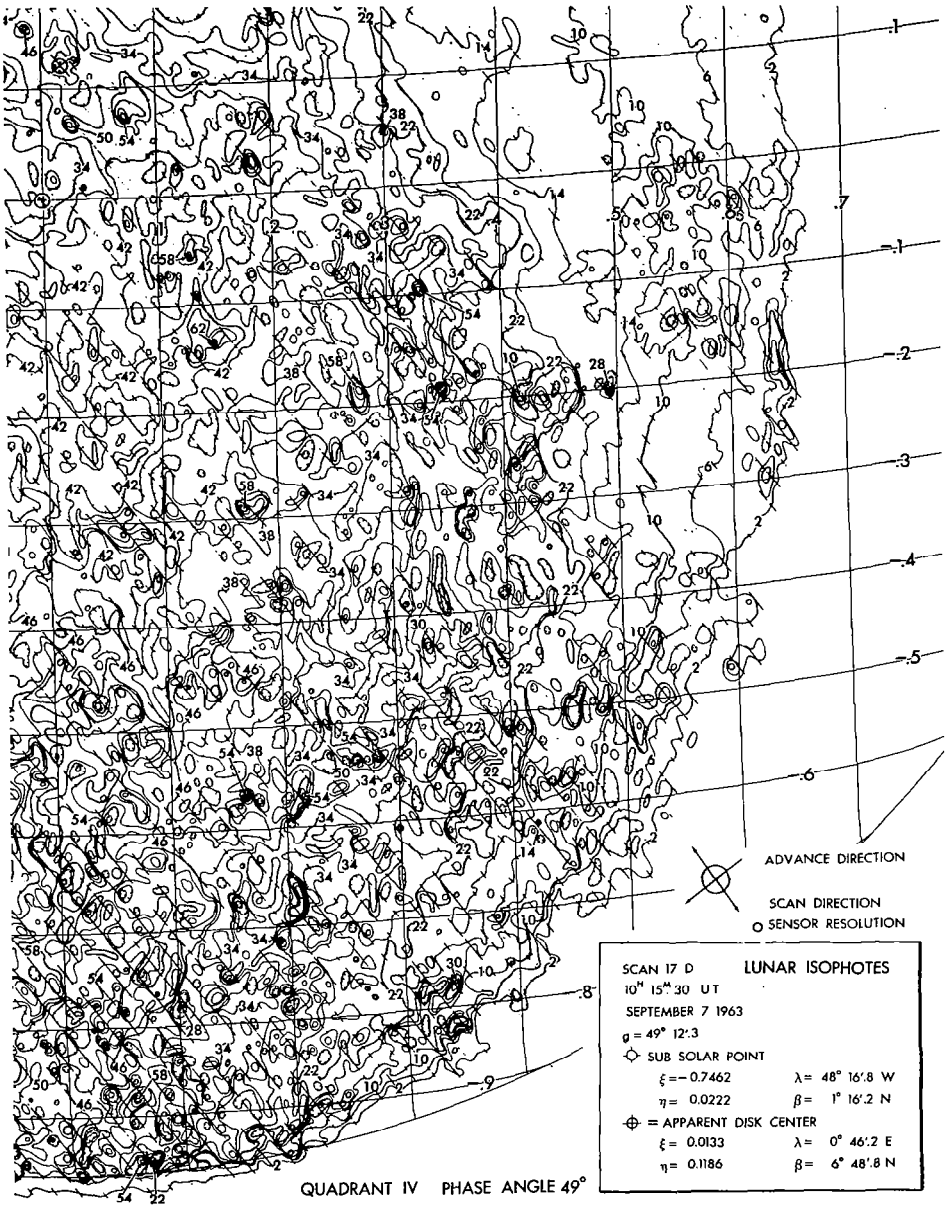
Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	28.21	122	59.34
.75	.36	62	30.16	126	61.29
2	.97	66	32.10	130	63.23
6	2.92	70	34.05	134	65.18
10	4.86	74	35.99		
14	6.81	78	37.94		
18	8.76	82	39.88		
22	10.70	86	41.83		
26	12.65	90	43.78		
30	14.59	94	45.72		
34	16.54	98	47.67		
38	18.48	102	49.61		
42	20.43	106	51.56		
46	22.37	110	53.50		
50	24.32	114	55.45		
54	26.27	118	57.40		



QUADRANT III PHASE ANGLE 49°

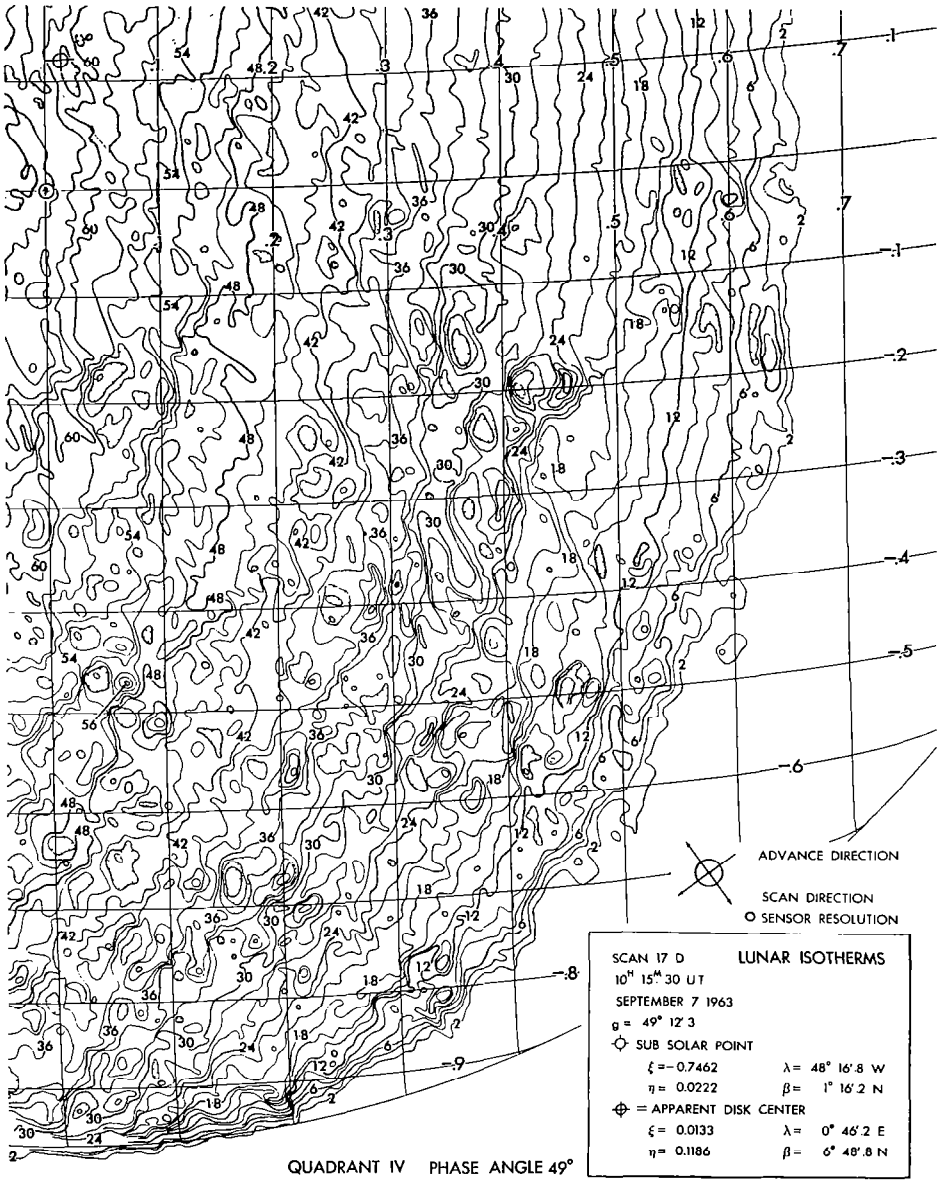
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.1	34	299.1	66	351.2	98	391.4
4	201.4	36	303.0	68	354.0	100	393.7
6	214.8	38	306.8	70	356.7		
8	225.3	40	310.4	72	359.4		
10	234.3	42	314.0	74	362.0		
12	242.1	44	317.5	76	364.6		
14	249.2	46	320.9	78	367.2		
16	255.6	48	324.2	80	369.7		
18	261.6	50	327.4	82	372.3		
20	267.1	52	330.6	84	374.7		
22	272.4	54	333.7	86	377.2		
24	277.3	56	336.7	88	379.6		
26	282.0	58	339.7	90	382.0		
28	286.6	60	342.7	92	384.4		
30	290.9	62	345.6	94	386.8		
32	295.1	64	348.4	96	389.1		



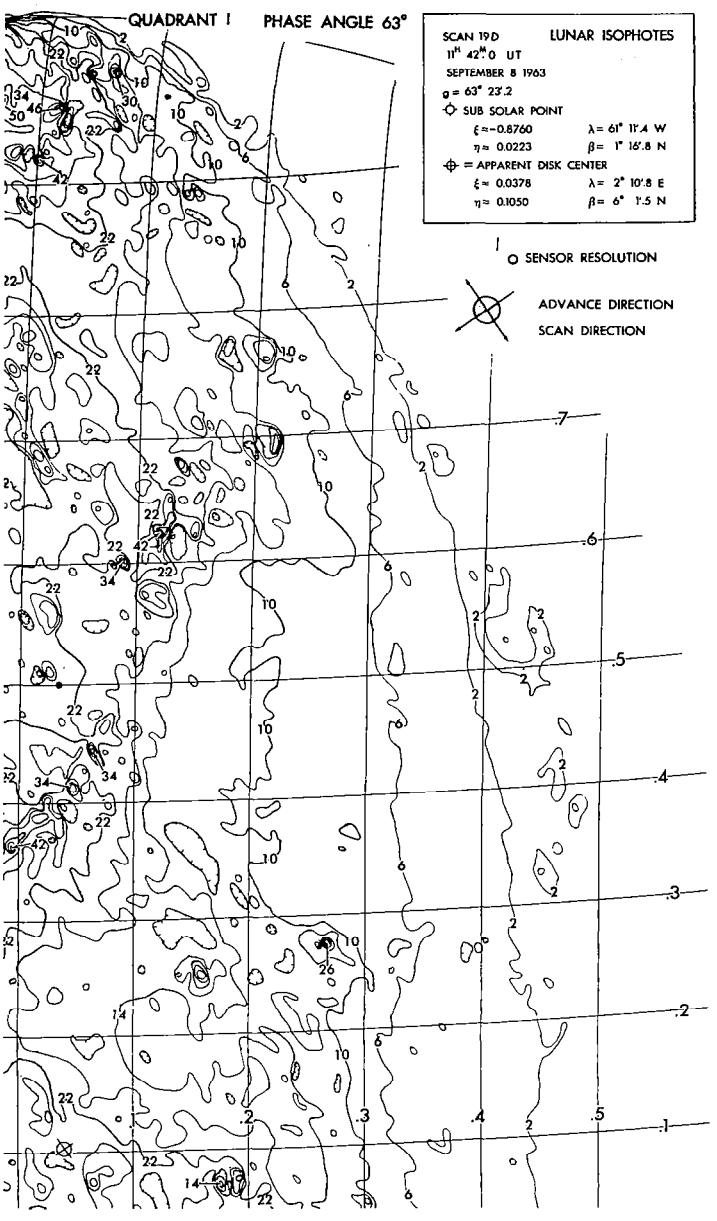
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.12	58	28.21	122	59.34
.75	.36	62	30.16	126	61.29
2	.97	66	32.10	130	63.23
6	2.92	70	34.05	134	65.18
10	4.86	74	35.99		
14	6.81	78	37.94		
18	8.76	82	39.88		
22	10.70	86	41.83		
26	12.65	90	43.78		
30	14.59	94	45.72		
34	16.54	98	47.67		
38	18.48	102	49.61		
42	20.43	106	51.56		
46	22.37	110	53.50		
50	24.32	114	55.45		
54	26.27	118	57.40		



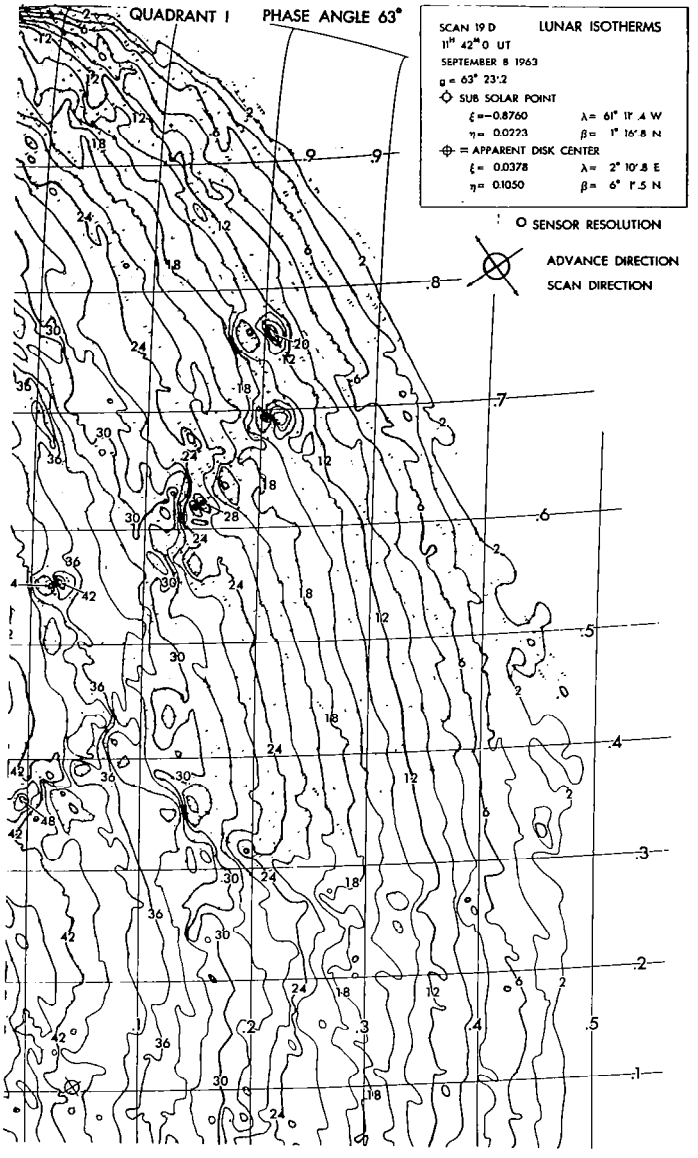
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	182.1	34	299.1	66	351.2	98	391.4
4	201.4	36	303.0	68	354.0	100	393.7
6	214.8	38	306.8	70	356.7		
8	225.3	40	310.4	72	359.4		
10	234.3	42	314.0	74	362.0		
12	242.1	44	317.5	76	364.6		
14	249.2	46	320.9	78	367.2		
16	255.6	48	324.2	80	369.7		
18	261.6	50	327.4	82	372.3		
20	267.1	52	330.6	84	374.7		
22	272.4	54	333.7	86	377.2		
24	277.3	56	336.7	88	379.6		
26	282.0	58	339.7	90	382.0		
28	286.6	60	342.7	92	384.4		
30	290.9	62	345.6	94	386.8		
32	295.1	64	348.4	96	389.1		



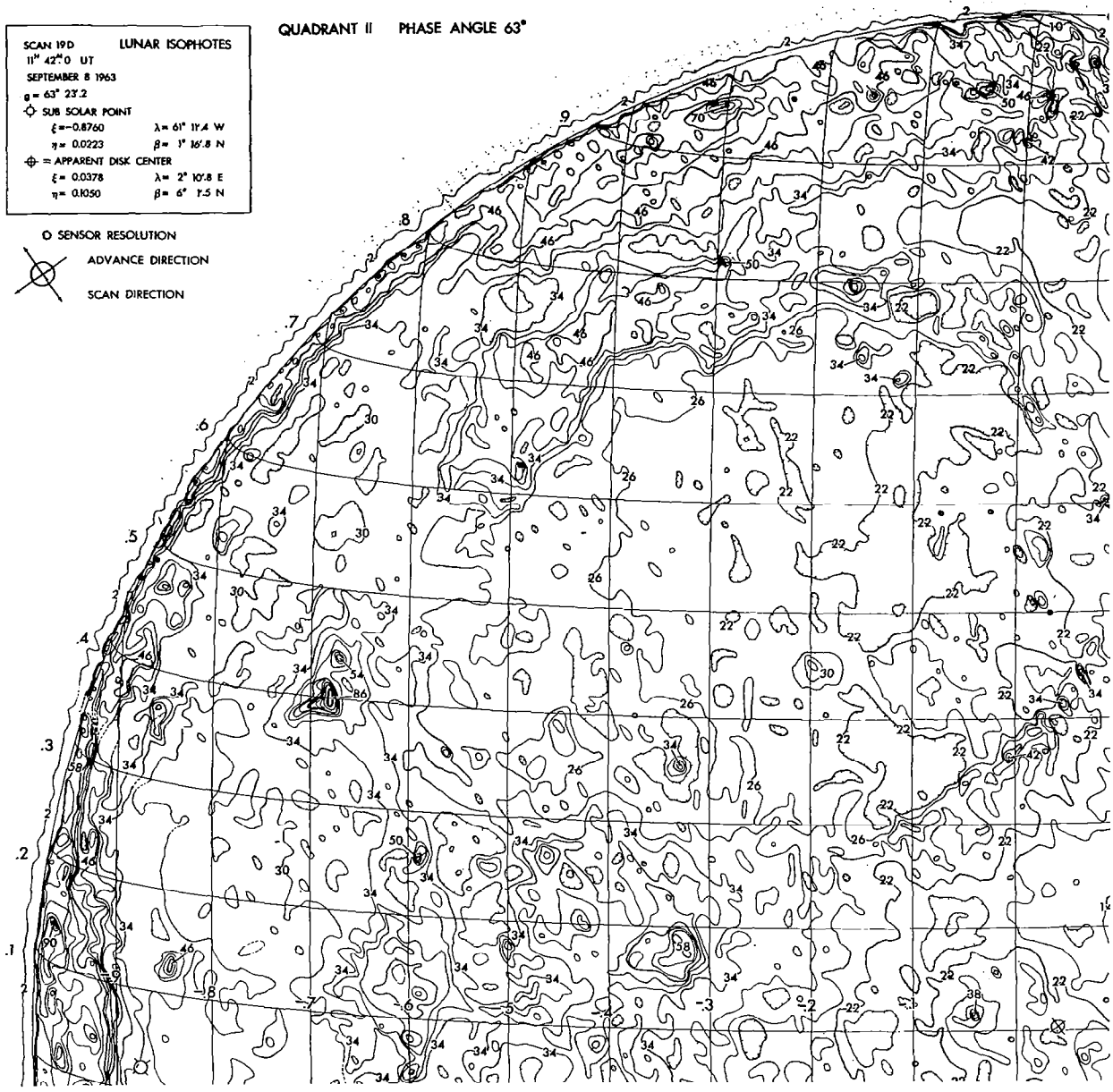
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.13	58	29.35	122	61.73
.75	.38	62	31.37		
2	1.01	66	33.40		
6	3.03	70	35.42		
10	5.06	74	37.44		
14	7.08	78	39.47		
18	9.11	82	41.49		
22	11.13	86	43.51		
26	13.16	90	45.54		
30	15.18	94	47.56		
34	17.20	98	49.59		
38	19.23	102	51.61		
42	21.25	106	53.64		
46	23.28	110	55.66		
50	25.30	114	57.68		
54	27.32	118	59.71		



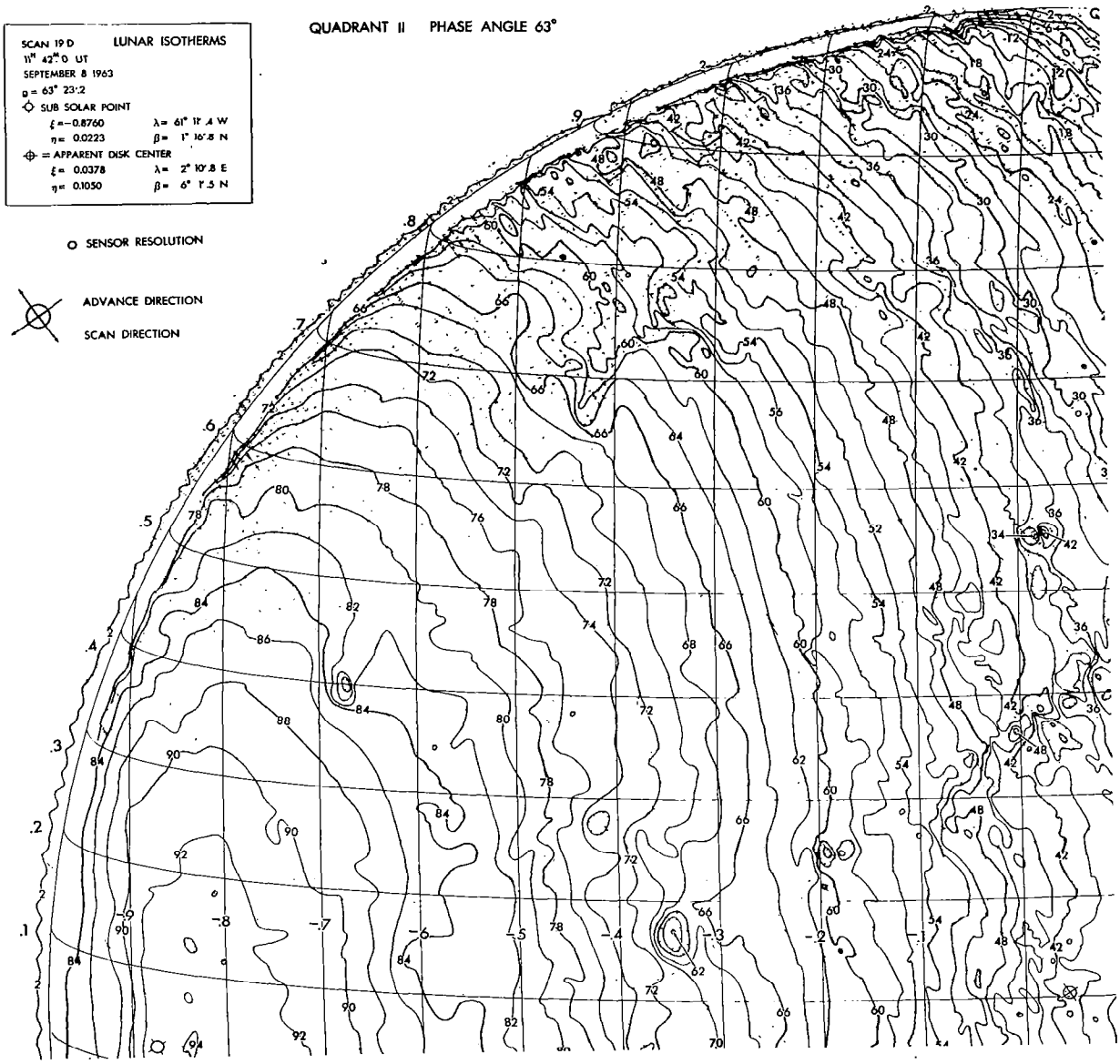
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	181.4	34	297.1	66	348.5
4	200.5	36	300.9	68	351.2
6	213.7	38	304.7	70	353.9
8	224.2	40	308.3	72	356.5
10	233.0	42	311.8	74	359.1
12	240.8	44	315.2	76	361.7
14	247.8	46	318.6	78	364.2
16	254.1	48	321.8	80	366.7
18	260.0	50	325.0	82	369.2
20	265.5	52	328.1	84	371.6
22	270.7	54	331.2	86	374.0
24	275.6	56	334.2	88	376.4
26	280.3	58	337.2	90	378.8
28	284.7	60	340.1	92	381.1
30	289.0	62	342.9	94	383.5
32	293.1	64	345.7		



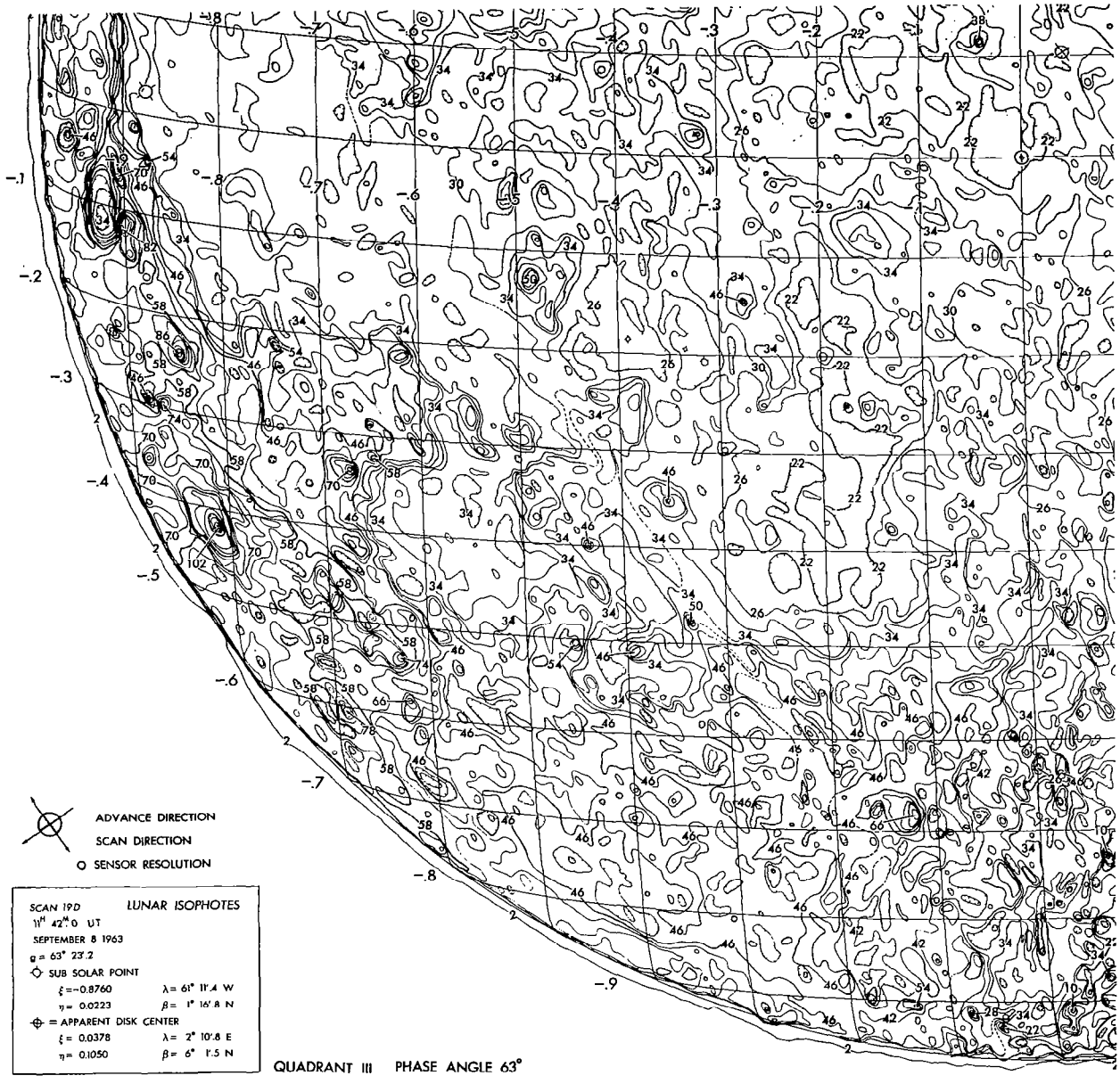
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.13	58	29.35	122	61.73
.75	.38	62	31.37		
2	1.01	66	33.40		
6	3.03	70	35.42		
10	5.06	74	37.44		
14	7.08	78	39.47		
18	9.11	82	41.49		
22	11.13	86	43.51		
26	13.16	90	45.54		
30	15.18	94	47.56		
34	17.20	98	49.59		
38	19.23	102	51.61		
42	21.25	106	53.64		
46	23.28	110	55.66		
50	25.30	114	57.68		
54	27.32	118	59.71		



THERMAL CALIBRATION DATA

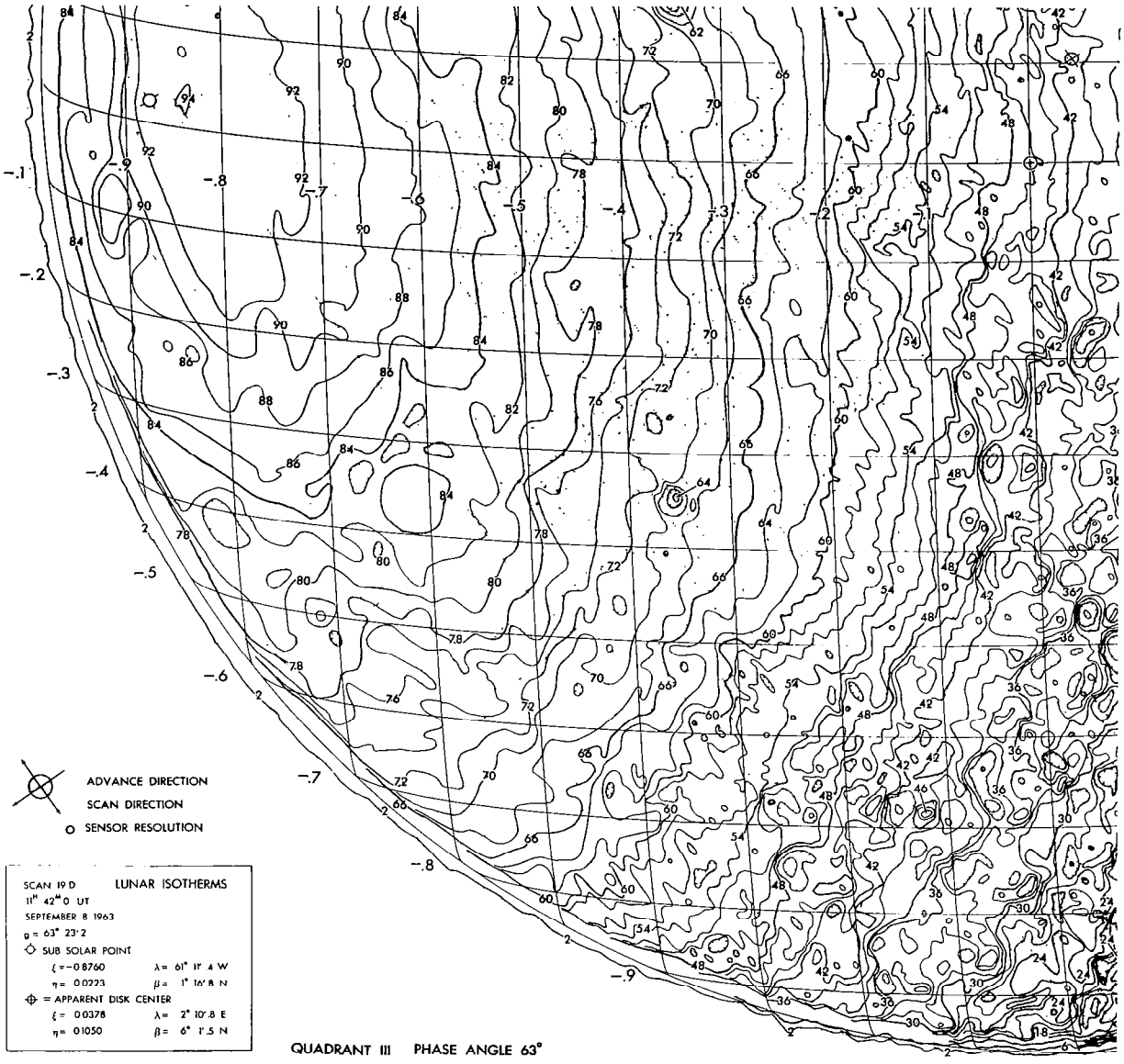
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	181.4	34	297.1	66	348.5
4	200.5	36	300.9	68	351.2
6	213.7	38	304.7	70	353.9
8	224.2	40	308.3	72	356.5
10	233.0	42	311.8	74	359.1
12	240.8	44	315.2	76	361.7
14	247.8	46	318.6	78	364.2
16	254.1	48	321.8	80	366.7
18	260.0	50	325.0	82	369.2
20	265.5	52	328.1	84	371.6
22	270.7	54	331.2	86	374.0
24	275.6	56	334.2	88	376.4
26	280.3	58	337.2	90	378.8
28	284.7	60	340.1	92	381.1
30	289.0	62	342.9	94	383.5
32	293.1	64	345.7		



QUADRANT III PHASE ANGLE 63°

BRIGHTNESS CALIBRATION DATA

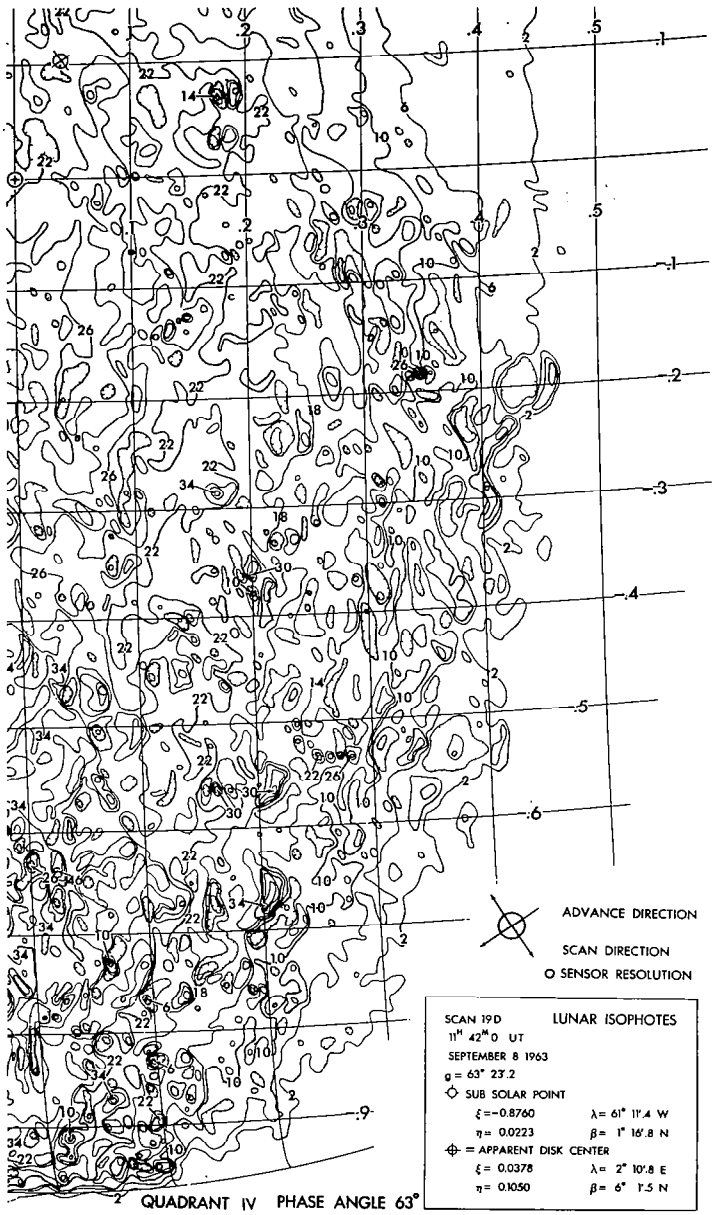
Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.13	58	29.35	122	61.73
.75	.38	62	31.37		
2	1.01	66	33.40		
6	3.03	70	35.42		
10	5.06	74	37.44		
14	7.08	78	39.47		
18	9.11	82	41.49		
22	11.13	86	43.51		
26	13.16	90	45.54		
30	15.18	94	47.56		
34	17.20	98	49.59		
38	19.23	102	51.61		
42	21.25	106	53.64		
46	23.28	110	55.66		
50	25.30	114	57.68		
54	27.32	118	59.71		



QUADRANT III PHASE ANGLE 63°

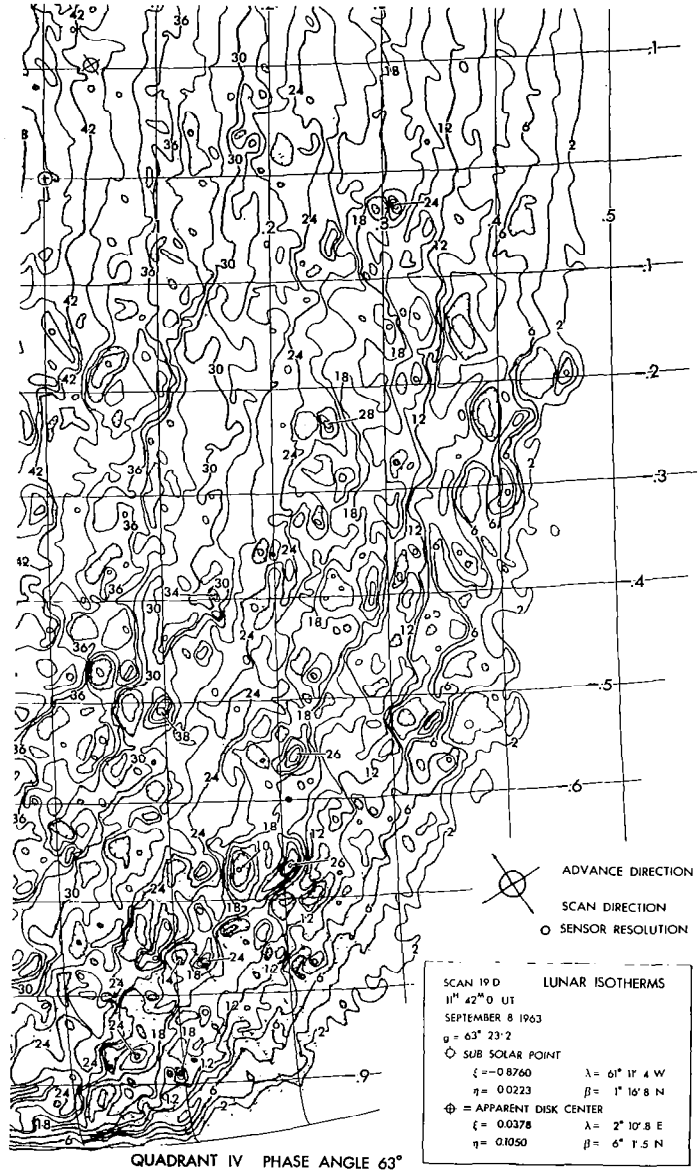
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	181.4	34	297.1	66	348.5
4	200.5	36	300.9	68	351.2
6	213.7	38	304.7	70	353.9
8	224.2	40	308.3	72	356.5
10	233.0	42	311.8	74	359.1
12	240.8	44	315.2	76	361.7
14	247.8	46	318.6	78	364.2
16	254.1	48	321.8	80	366.7
18	260.0	50	325.0	82	369.2
20	265.5	52	328.1	84	371.6
22	270.7	54	331.2	86	374.0
24	275.6	56	334.2	88	376.4
26	280.3	58	337.2	90	378.8
28	284.7	60	340.1	92	381.1
30	289.0	62	342.9	94	383.5
32	293.1	64	345.7		



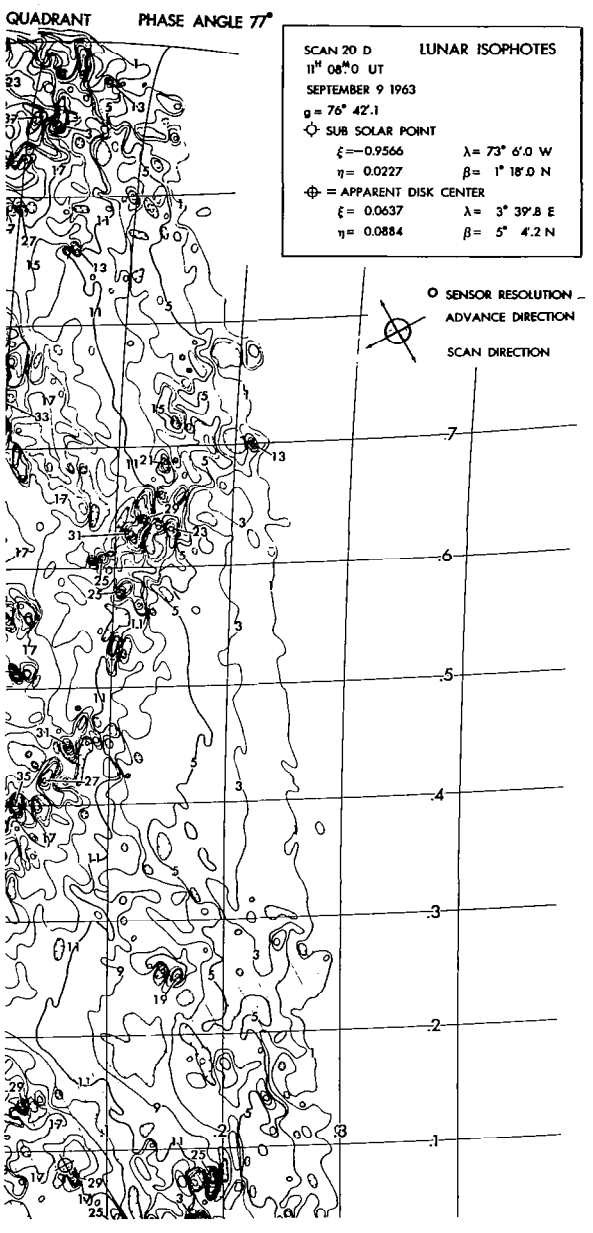
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.13	58	29.35	122	61.73
.75	.38	62	31.37		
2	1.01	66	33.40		
6	3.03	70	35.42		
10	5.06	74	37.44		
14	7.08	78	39.47		
18	9.11	82	41.49		
22	11.13	86	43.51		
26	13.16	90	45.54		
30	15.18	94	47.56		
34	17.20	98	49.59		
38	19.23	102	51.61		
42	21.25	106	53.64		
46	23.28	110	55.66		
50	25.30	114	57.68		
54	27.32	118	59.71		



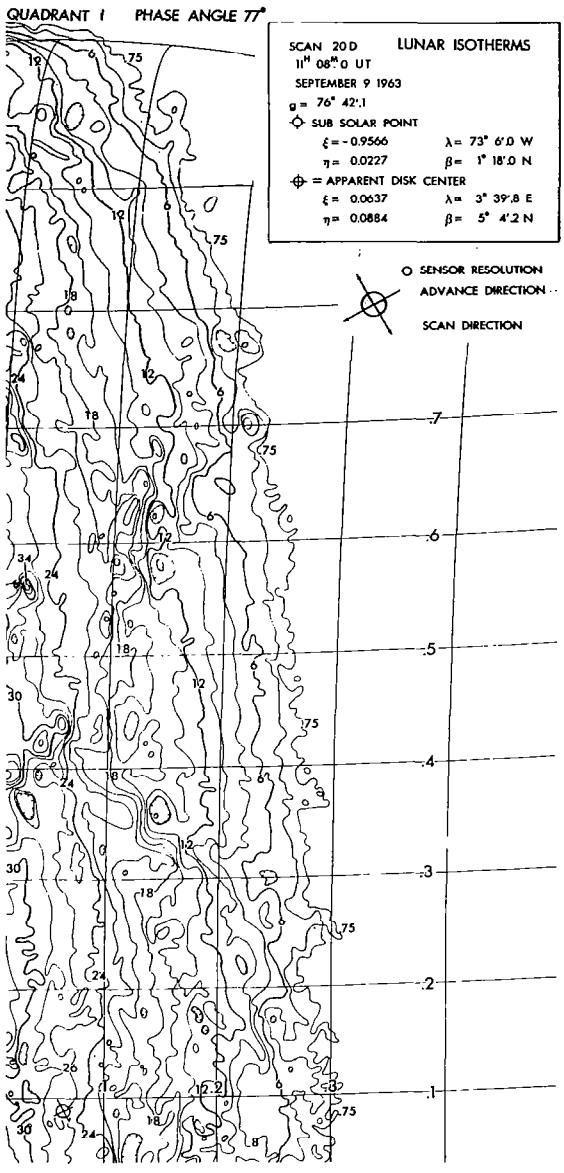
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
2	181.4	34	297.1	66	348.5
4	200.5	36	300.9	68	351.2
6	213.7	38	304.7	70	353.9
8	224.2	40	308.3	72	356.5
10	233.0	42	311.8	74	359.1
12	240.8	44	315.2	76	361.7
14	247.8	46	318.6	78	364.2
16	254.1	48	321.8	80	366.7
18	260.0	50	325.0	82	369.2
20	265.5	52	328.1	84	371.6
22	270.7	54	331.2	86	374.0
24	275.6	56	334.2	88	376.4
26	280.3	58	337.2	90	378.8
28	284.7	60	340.1	92	381.1
30	289.0	62	342.9	94	383.5
32	293.1	64	345.7		



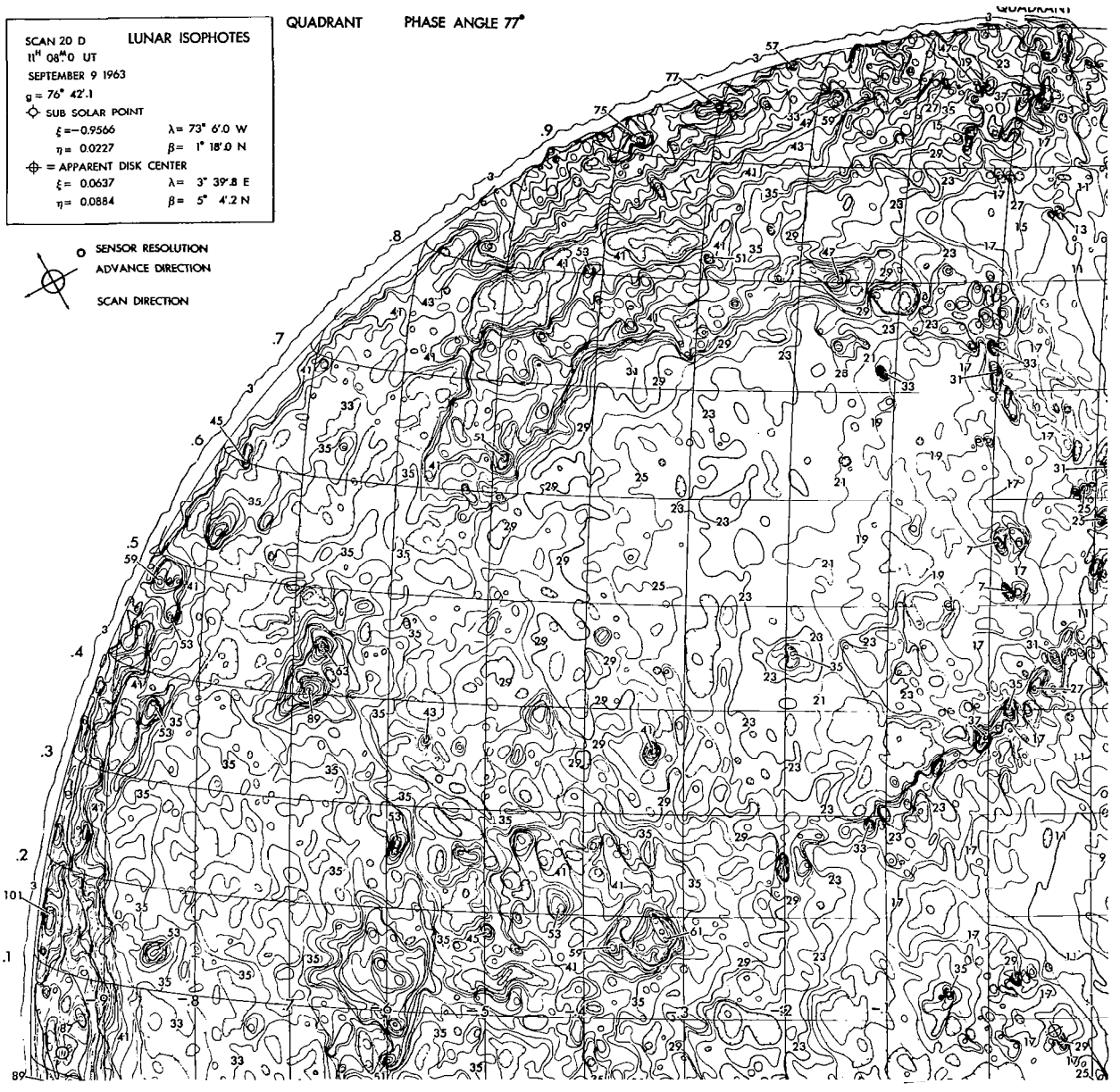
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.17	.06	29	10.53	61	22.15	93	33.77	125	45.39
.50	.18	31	11.26	63	22.88	95	34.50	127	46.12
1	.36	33	11.98	65	23.60	97	35.23	129	46.85
3	1.09	35	12.71	67	24.33	99	35.95		
5	1.82	37	13.44	69	25.06	101	36.68		
7	2.54	39	14.16	71	25.78	103	37.40		
9	3.27	41	14.89	73	26.51	105	38.13		
11	3.99	43	15.62	75	27.24	107	38.86		
13	4.72	45	16.34	77	27.96	109	39.58		
15	5.45	47	17.07	79	28.69	111	40.31		
17	6.17	49	17.79	81	29.42	113	41.04		
19	6.90	51	18.52	83	30.14	115	41.76		
21	7.63	53	19.25	85	30.87	117	42.49		
23	8.35	55	19.97	87	31.59	119	43.21		
25	9.08	57	20.70	89	32.32	121	43.94		
27	9.81	59	21.43	91	33.05	123	44.67		



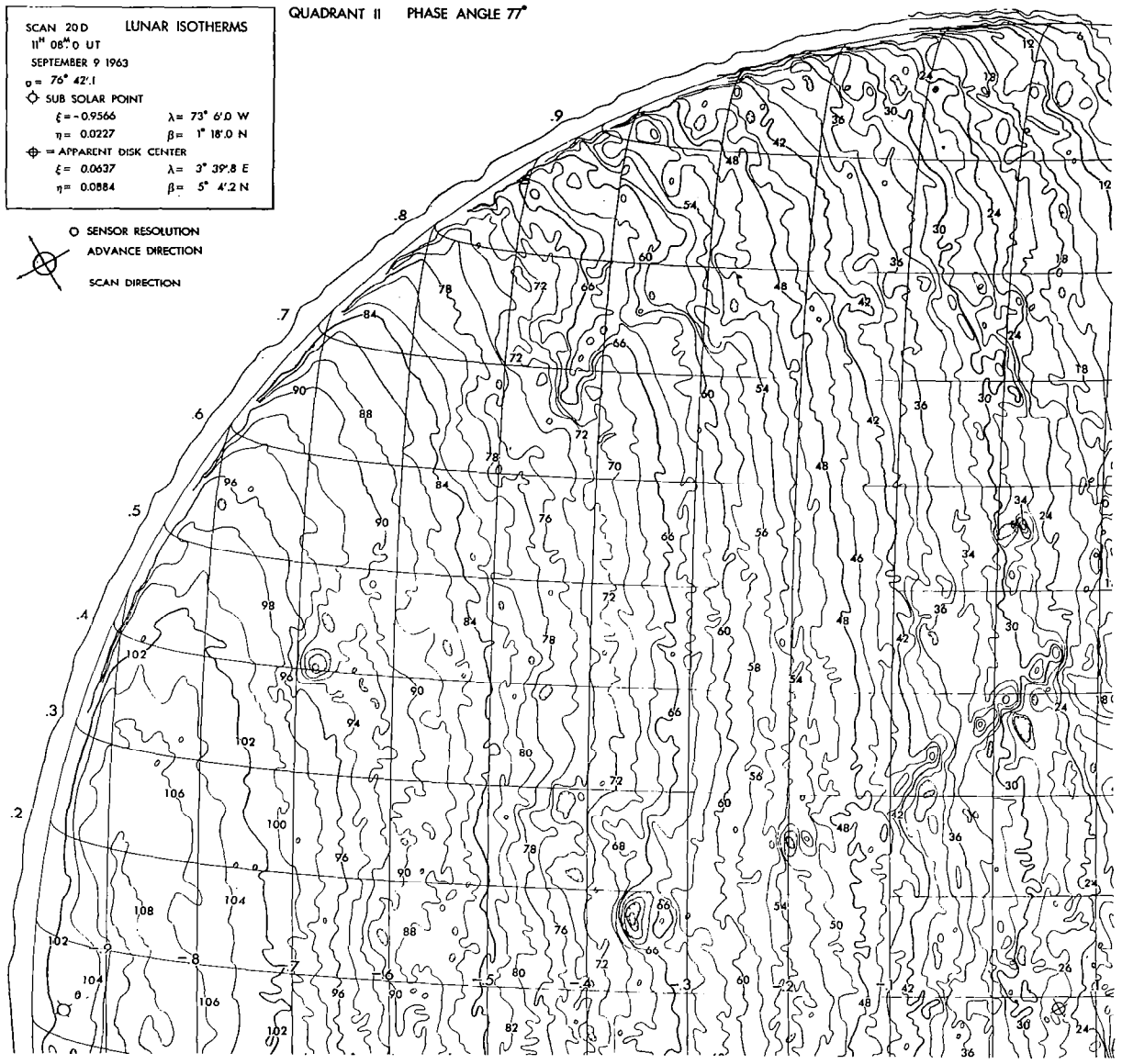
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.9	34	277.3	66	325.3	98	360.3
4	175.1	36	282.6	68	327.8	100	362.3
6	192.9	38	286.0	70	330.1	102	364.2
8	205.1	40	289.3	72	332.5	104	366.2
10	214.7	42	292.4	74	334.8	106	368.1
12	222.9	44	295.5	76	337.1	108	370.0
14	229.9	46	298.6	78	339.3	110	371.9
16	236.3	48	301.5	80	341.5		
18	242.1	50	304.4	82	343.7		
20	247.4	52	307.2	84	345.9		
22	252.4	54	309.9	86	348.0		
24	257.1	56	312.6	88	350.1		
26	261.5	58	315.3	90	352.2		
28	265.7	60	317.9	92	354.3		
30	269.8	62	320.4	94	356.3		
32	273.6	64	322.9	96	358.3		



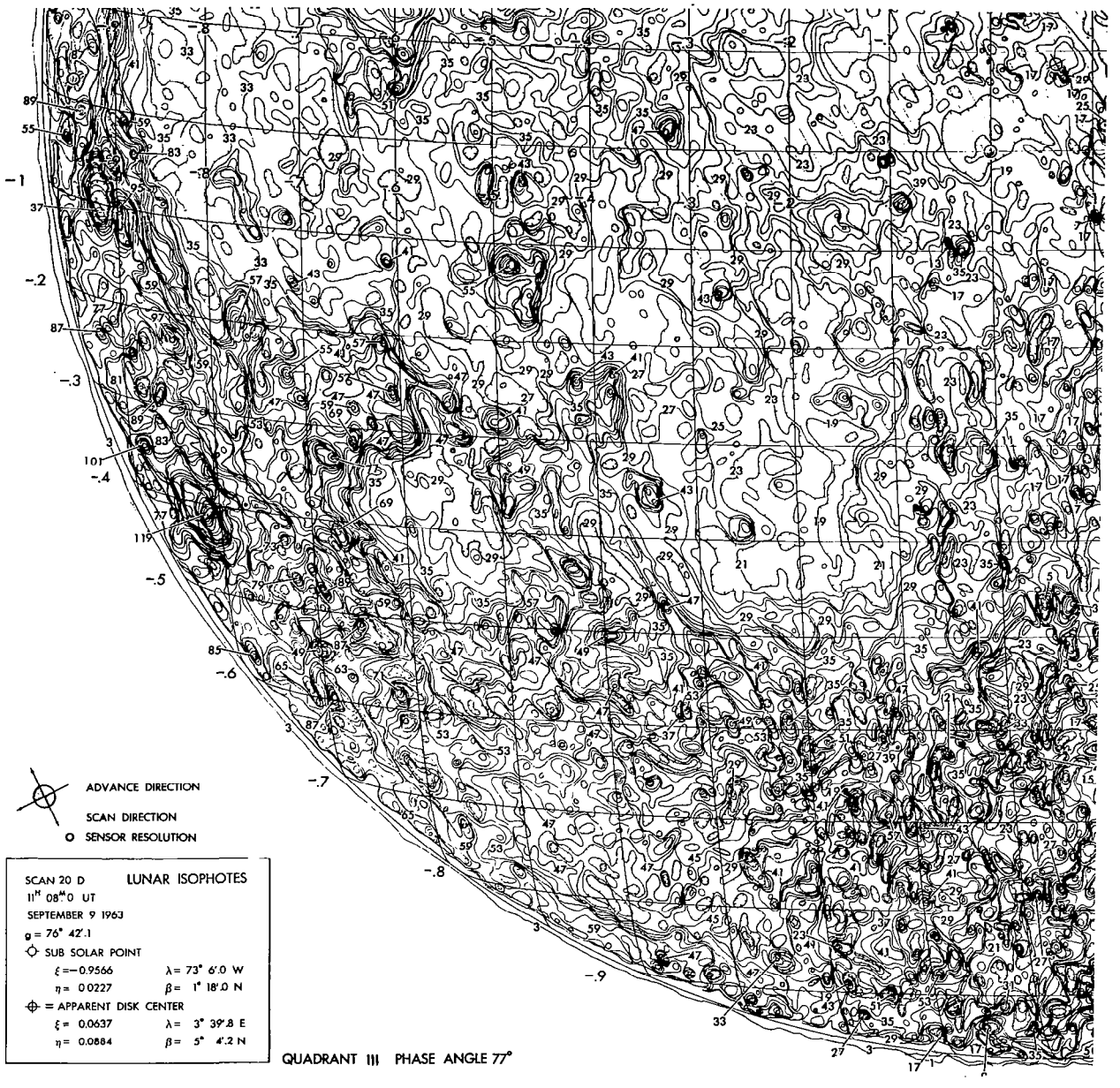
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.17	.06	29	10.53	61	22.15	93	33.77	125	45.39
.50	.18	31	11.26	63	22.88	95	34.50	127	46.12
1	.36	33	11.98	65	23.60	97	35.23	129	46.85
3	1.09	35	12.71	67	24.33	99	35.95		
5	1.82	37	13.44	69	25.06	101	36.68		
7	2.54	39	14.16	71	25.78	103	37.40		
9	3.27	41	14.89	73	26.51	105	38.13		
11	3.99	43	15.62	75	27.24	107	38.86		
13	4.72	45	16.34	77	27.96	109	39.58		
15	5.45	47	17.07	79	28.69	111	40.31		
17	6.17	49	17.79	81	29.42	113	41.04		
19	6.90	51	18.52	83	30.14	115	41.76		
21	7.63	53	19.25	85	30.87	117	42.49		
23	8.35	55	19.97	87	31.59	119	43.21		
25	9.08	57	20.70	89	32.32	121	43.94		
27	9.81	59	21.43	91	33.05	123	44.67		



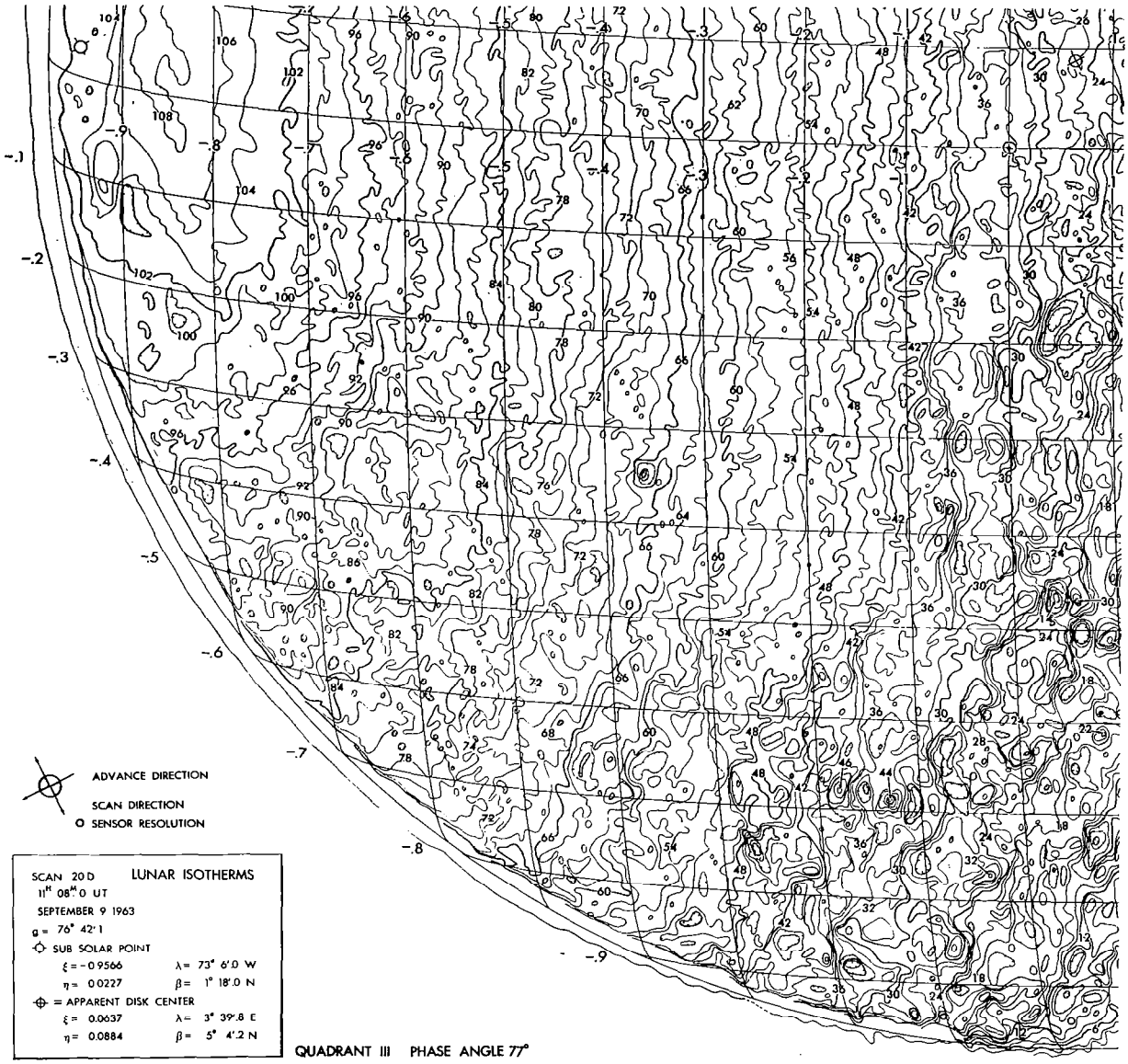
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.9	34	277.3	66	325.3	98	360.3
4	175.1	36	282.6	68	327.8	100	362.3
6	192.9	38	286.0	70	330.1	102	364.2
8	205.1	40	289.3	72	332.5	104	366.2
10	214.7	42	292.4	74	334.8	106	368.1
12	222.9	44	295.5	76	337.1	108	370.0
14	229.9	46	298.6	78	339.3	110	371.9
16	236.3	48	301.5	80	341.5		
18	242.1	50	304.4	82	343.7		
20	247.4	52	307.2	84	345.9		
22	252.4	54	309.9	86	348.0		
24	257.1	56	312.6	88	350.1		
26	261.5	58	315.3	90	352.2		
28	265.7	60	317.9	92	354.3		
30	269.8	62	320.4	94	356.3		
32	273.6	64	322.9	96	358.3		



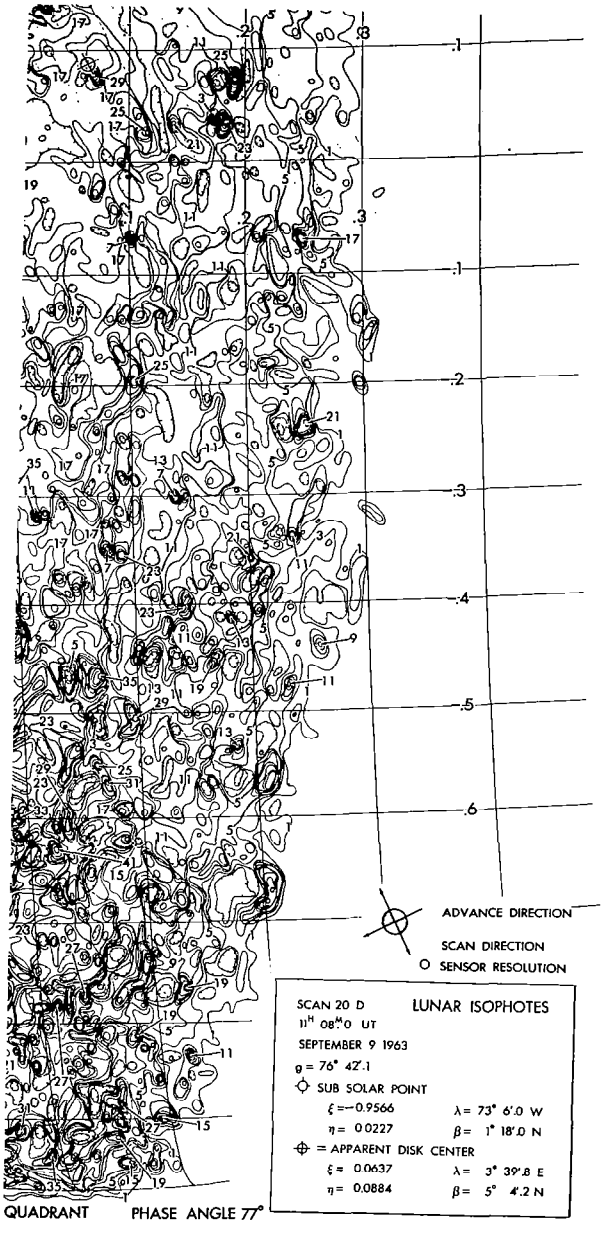
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.17	.06	29	10.53	61	22.15	93	33.77	125	45.39
.50	.18	31	11.26	63	22.88	95	34.50	127	46.12
1	.36	33	11.98	65	23.60	97	35.23	129	46.85
3	1.09	35	12.71	67	24.33	99	35.95		
5	1.82	37	13.44	69	25.06	101	36.68		
7	2.54	39	14.16	71	25.78	103	37.40		
9	3.27	41	14.89	73	26.51	105	38.13		
11	3.99	43	15.62	75	27.24	107	38.86		
13	4.72	45	16.34	77	27.96	109	39.58		
15	5.45	47	17.07	79	28.69	111	40.31		
17	6.17	49	17.79	81	29.42	113	41.04		
19	6.90	51	18.52	83	30.14	115	41.76		
21	7.63	53	19.25	85	30.87	117	42.49		
23	8.35	55	19.97	87	31.59	119	43.21		
25	9.08	57	20.70	89	32.32	121	43.94		
27	9.81	59	21.43	91	33.05	123	44.67		



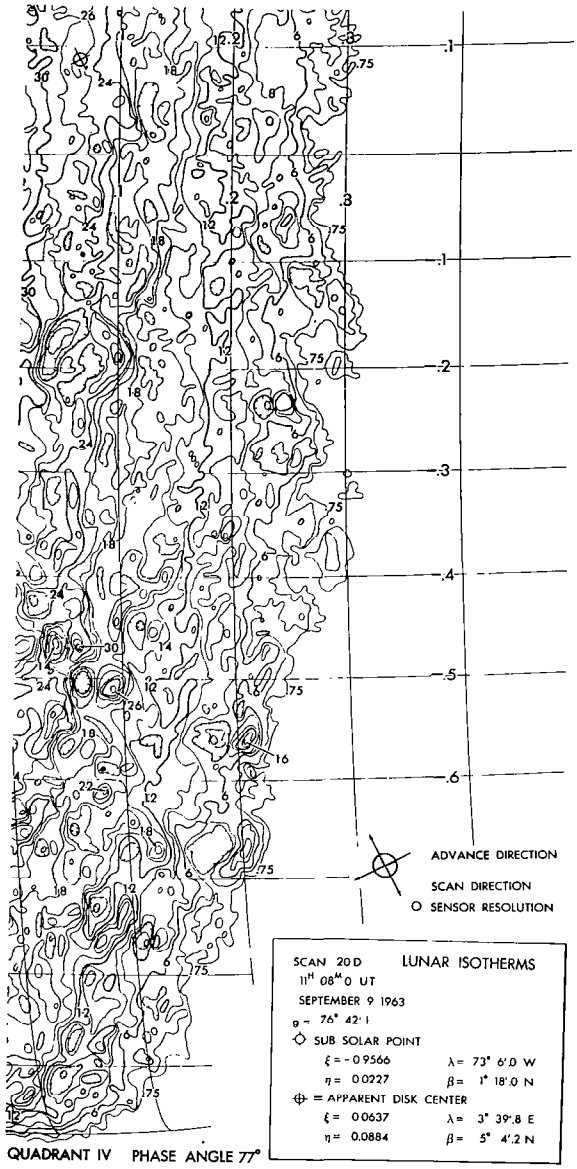
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.9	34	277.3	66	325.3	98	360.3
4	175.1	36	282.6	68	327.8	100	362.3
6	192.9	38	286.0	70	330.1	102	364.2
8	205.1	40	289.3	72	332.5	104	366.2
10	214.7	42	292.4	74	334.8	106	368.1
12	222.9	44	295.5	76	337.1	108	370.0
14	229.9	46	298.6	78	339.3	110	371.9
16	236.3	48	301.5	80	341.5		
18	242.1	50	304.4	82	343.7		
20	247.4	52	307.2	84	345.9		
22	252.4	54	309.9	86	348.0		
24	257.1	56	312.6	88	350.1		
26	261.5	58	315.3	90	352.2		
28	265.7	60	317.9	92	354.3		
30	269.8	62	320.4	94	356.3		
32	273.6	64	322.9	96	358.3		



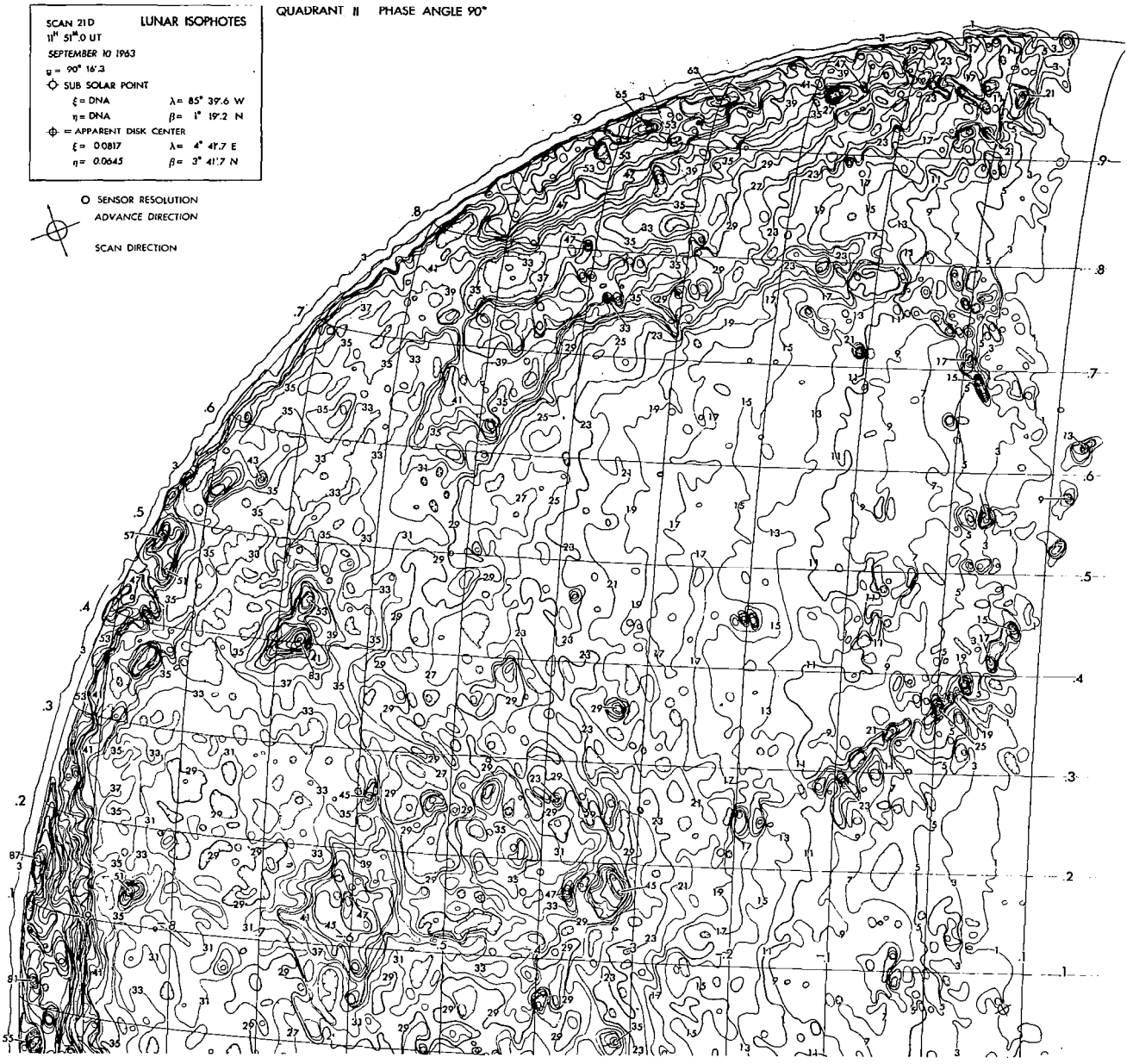
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.17	.06	29	10.53	61	22.15	93	33.77	125	45.39
.50	.18	31	11.26	63	22.88	95	34.50	127	46.12
1	.36	33	11.98	65	23.60	97	35.23	129	46.85
3	1.09	35	12.71	67	24.33	99	35.95		
5	1.82	37	13.44	69	25.06	101	36.68		
7	2.54	39	14.16	71	25.78	103	37.40		
9	3.27	41	14.89	73	26.51	105	38.13		
11	3.99	43	15.62	75	27.24	107	38.86		
13	4.72	45	16.34	77	27.96	109	39.58		
15	5.45	47	17.07	79	28.69	111	40.31		
17	6.17	49	17.79	81	29.42	113	41.04		
19	6.90	51	18.52	83	30.14	115	41.76		
21	7.63	53	19.25	85	30.87	117	42.49		
23	8.35	55	19.97	87	31.59	119	43.21		
25	9.08	57	20.70	89	32.32	121	43.94		
27	9.81	59	21.43	91	33.05	123	44.67		



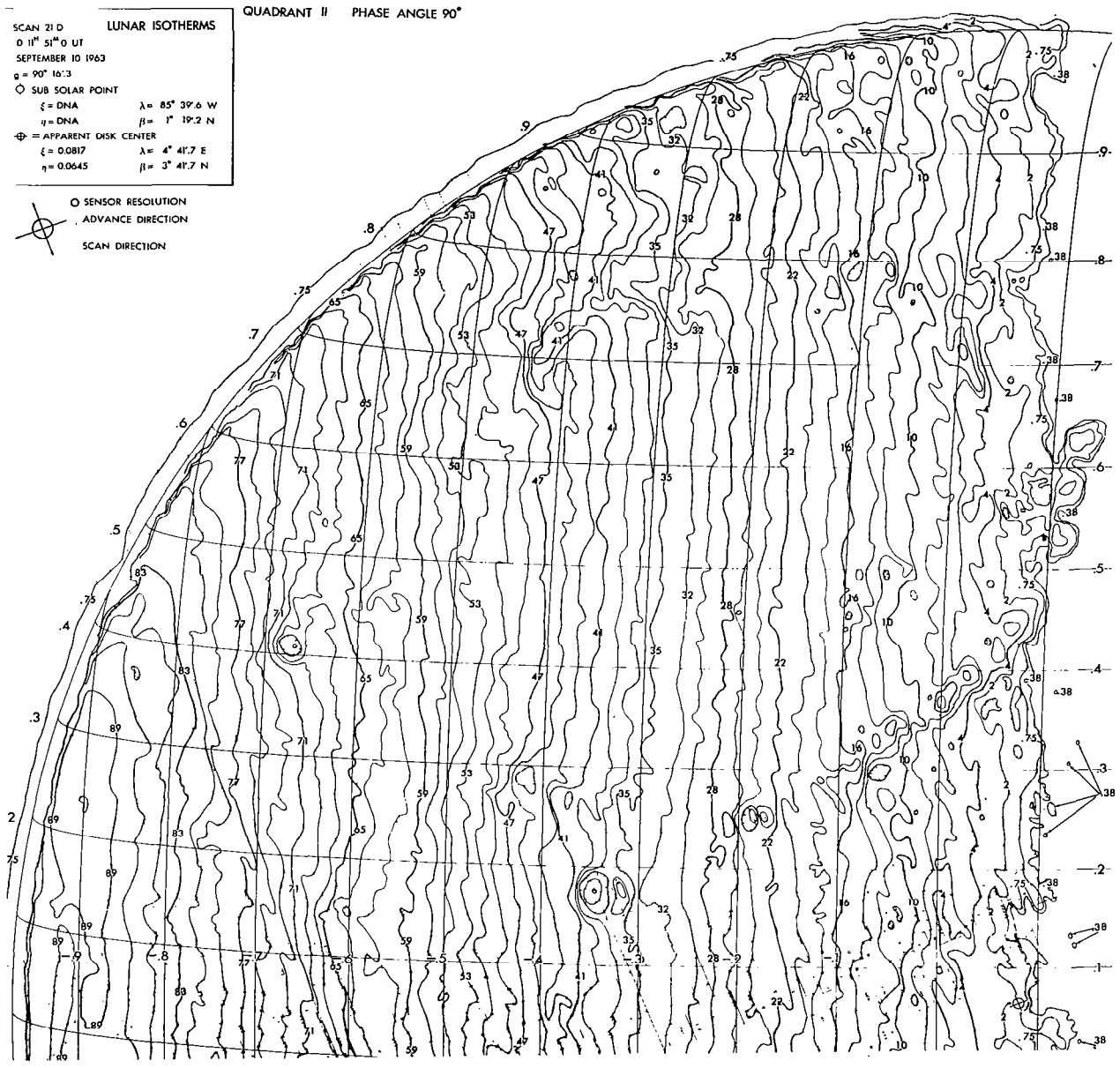
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	154.9	34	277.3	66	325.3	98	360.3
4	175.1	36	282.6	68	327.8	100	362.3
6	192.9	38	286.0	70	330.1	102	364.2
8	205.1	40	289.3	72	332.5	104	366.2
10	214.7	42	292.4	74	334.8	106	368.1
12	222.9	44	295.5	76	337.1	108	370.0
14	229.9	46	298.6	78	339.3	110	371.9
16	236.3	48	301.5	80	341.5		
18	242.1	50	304.4	82	343.7		
20	247.4	52	307.2	84	345.9		
22	252.4	54	309.9	86	348.0		
24	257.1	56	312.6	88	350.1		
26	261.5	58	315.3	90	352.2		
28	265.7	60	317.9	92	354.3		
30	269.8	62	320.4	94	356.3		
32	273.6	64	322.9	96	358.3		



BRIGHTNESS CALIBRATION DATA

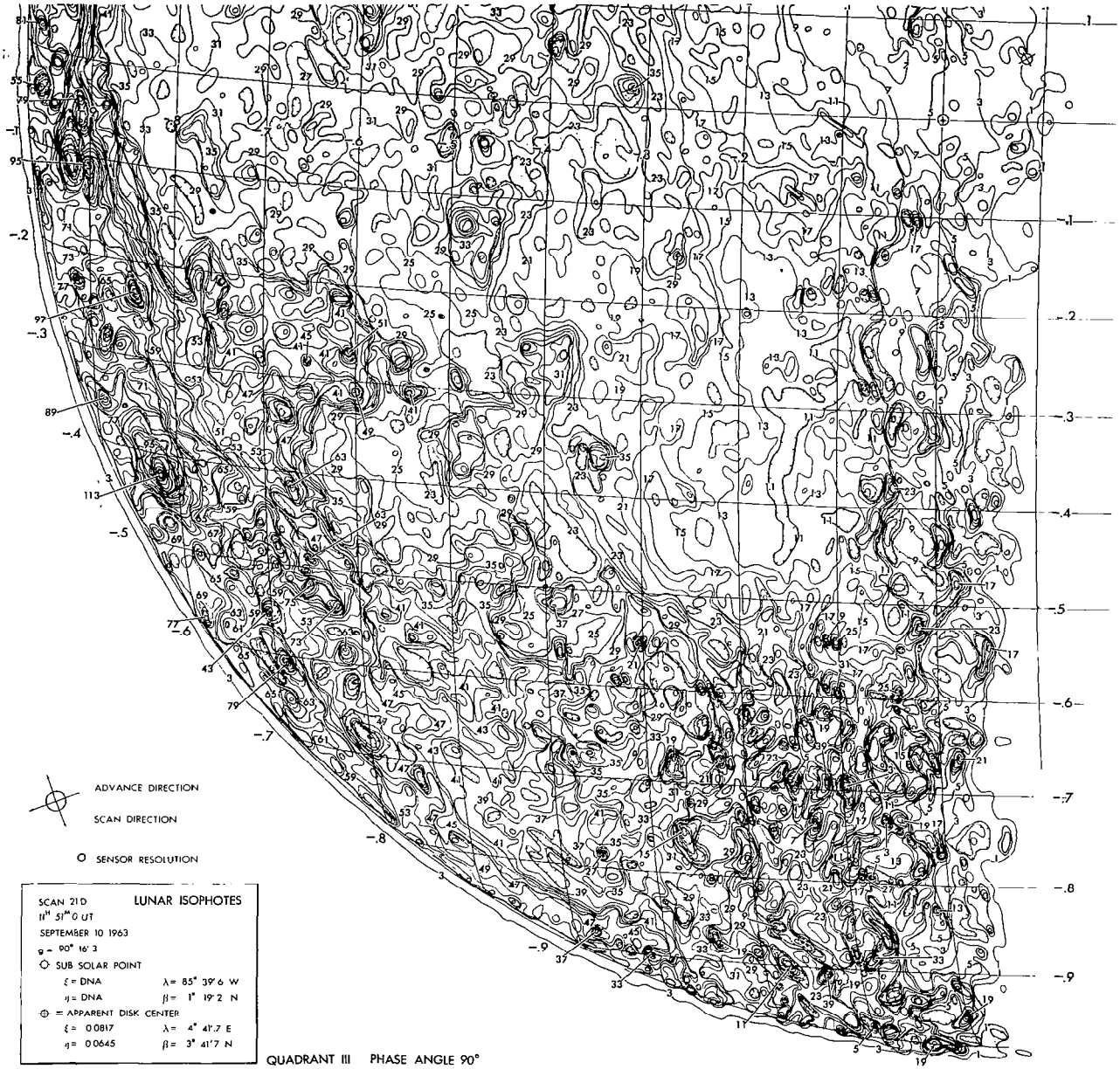
Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.12	.05	29	9.18	61	19.31	93	29.45
.50	.16	31	9.82	63	19.95	95	30.08
1	.32	33	10.45	65	20.58	97	30.72
3	.95	35	11.08	67	21.21	99	31.35
5	1.58	37	11.72	69	21.85	101	31.98
7	2.22	39	12.35	71	22.48	103	32.61
9	2.85	41	12.98	73	23.12	105	33.25
11	3.48	43	13.62	75	23.75	107	33.88
13	4.12	45	14.25	77	24.38	109	34.51
15	4.75	47	14.88	79	25.02	111	35.15
17	5.38	49	15.52	81	25.65	113	35.78
19	6.02	51	16.15	83	26.28	115	36.42
21	6.65	53	16.78	85	26.92	117	37.05
23	7.28	55	17.42	87	27.55	119	37.68
25	7.92	57	18.05	89	28.18	121	38.32
27	8.55	59	18.68	91	28.82	123	38.95



THERMAL CALIBRATION DATA

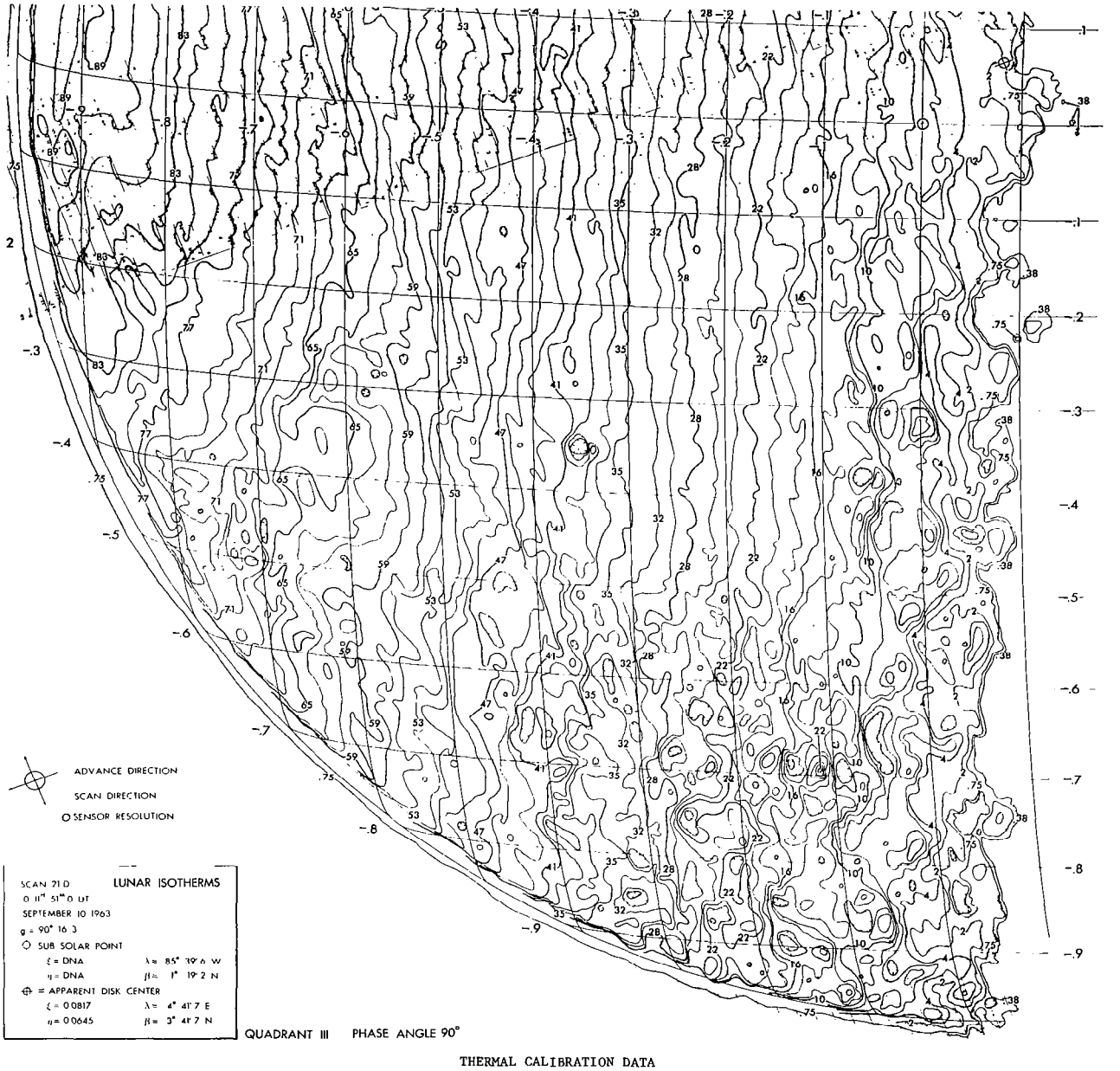
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.37	144.2	30	277.2	63	327.9
.75	156.0	32	281.0	65	330.5
2	176.6	*35	286.5	67	333.0
4	194.7	37	289.9	69	335.4
6	207.2	39	293.3	71	337.8
8	217.0	41	296.6	73	340.2
10	225.3	43	299.8	75	342.5
12	232.5	45	302.9	77	344.9
14	239.0	47	305.9	79	347.1
16	244.9	49	308.9	81	349.4
18	250.4	51	311.8	83	351.6
20	255.5	53	314.6	85	353.8
22	260.3	55	317.4	87	356.0
24	264.9	57	320.1	89	358.2
26	269.2	59	322.8	91	360.3
28	273.3	61	325.4	93	362.4

*Note change in levels contour from Number 35 on.



BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.12	.05	29	9.18	61	19.31	93	29.45
.50	.16	31	9.82	63	19.95	95	30.08
1	.32	33	10.45	65	20.58	97	30.72
3	.95	35	11.08	67	21.21	99	31.35
5	1.58	37	11.72	69	21.85	101	31.98
7	2.22	39	12.35	71	22.48	103	32.61
9	2.85	41	12.98	73	23.12	105	33.25
11	3.48	43	13.62	75	23.75	107	33.88
13	4.12	45	14.25	77	24.38	109	34.51
15	4.75	47	14.88	79	25.02	111	35.15
17	5.38	49	15.52	81	25.65	113	35.78
19	6.02	51	16.15	83	26.28	115	36.42
21	6.65	53	16.78	85	26.92	117	37.05
23	7.28	55	17.42	87	27.55	119	37.68
25	7.92	57	18.05	89	28.18	121	38.32
27	8.55	59	18.68	91	28.82	123	38.95

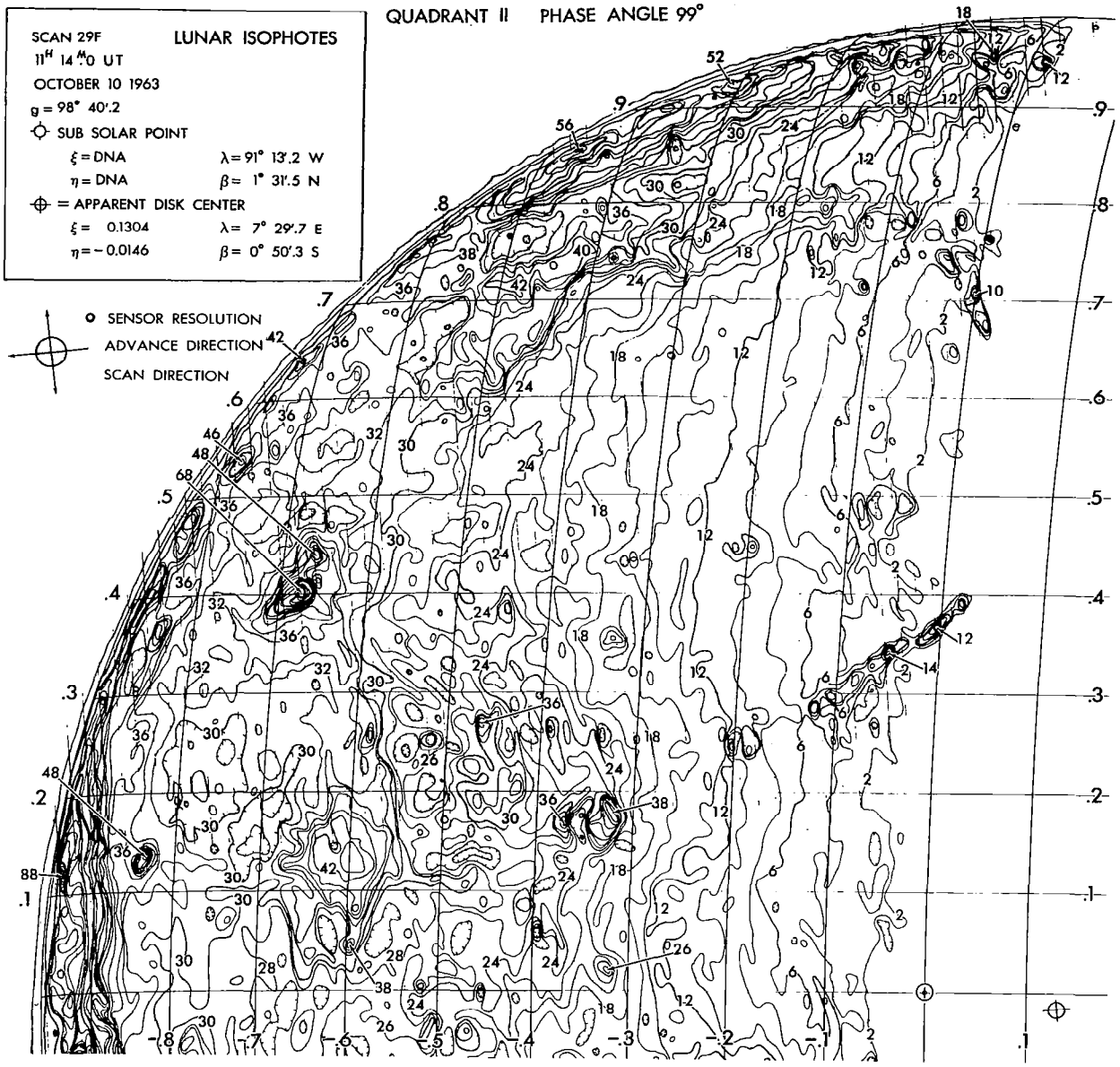


QUADRANT III PHASE ANGLE 90°

THERMAL CALIBRATION DATA

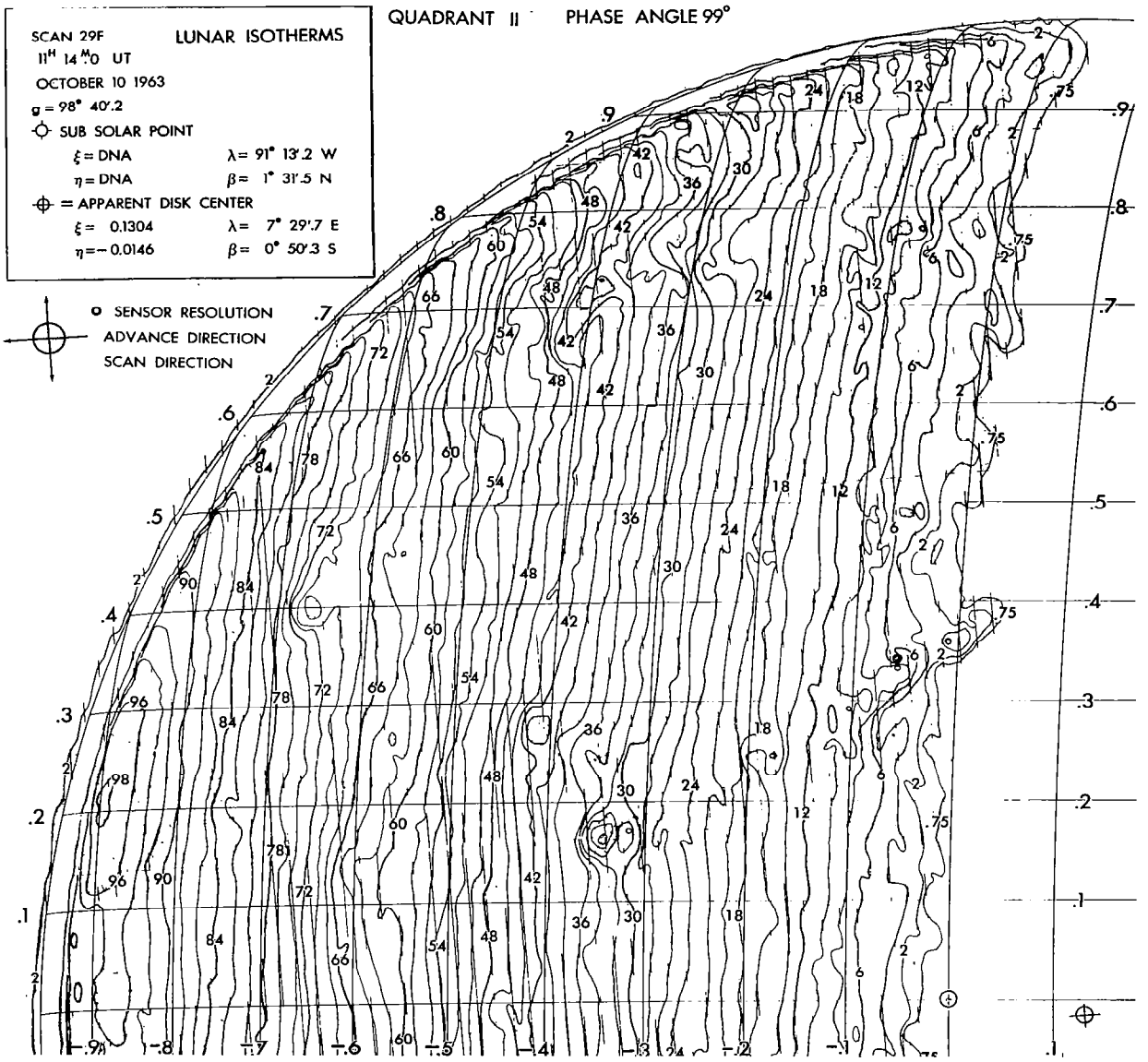
Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.37	144.2	30	277.2	63	327.9
.75	156.0	32	281.0	65	330.5
2	176.6	*35	286.5	67	333.0
4	194.7	37	289.9	69	335.4
6	207.2	39	293.3	71	337.8
8	217.0	41	296.6	73	340.2
10	225.3	43	299.8	75	342.5
12	232.5	45	302.9	77	344.9
14	239.0	47	305.9	79	347.1
16	244.9	49	308.9	81	349.4
18	250.4	51	311.8	83	351.6
20	255.5	53	314.6	85	353.8
22	260.3	55	317.4	87	356.0
24	264.9	57	320.1	89	358.2
26	269.2	59	322.8	91	360.3
28	273.3	61	325.4	93	362.4

*Note change in levels contour from Number 35 on.



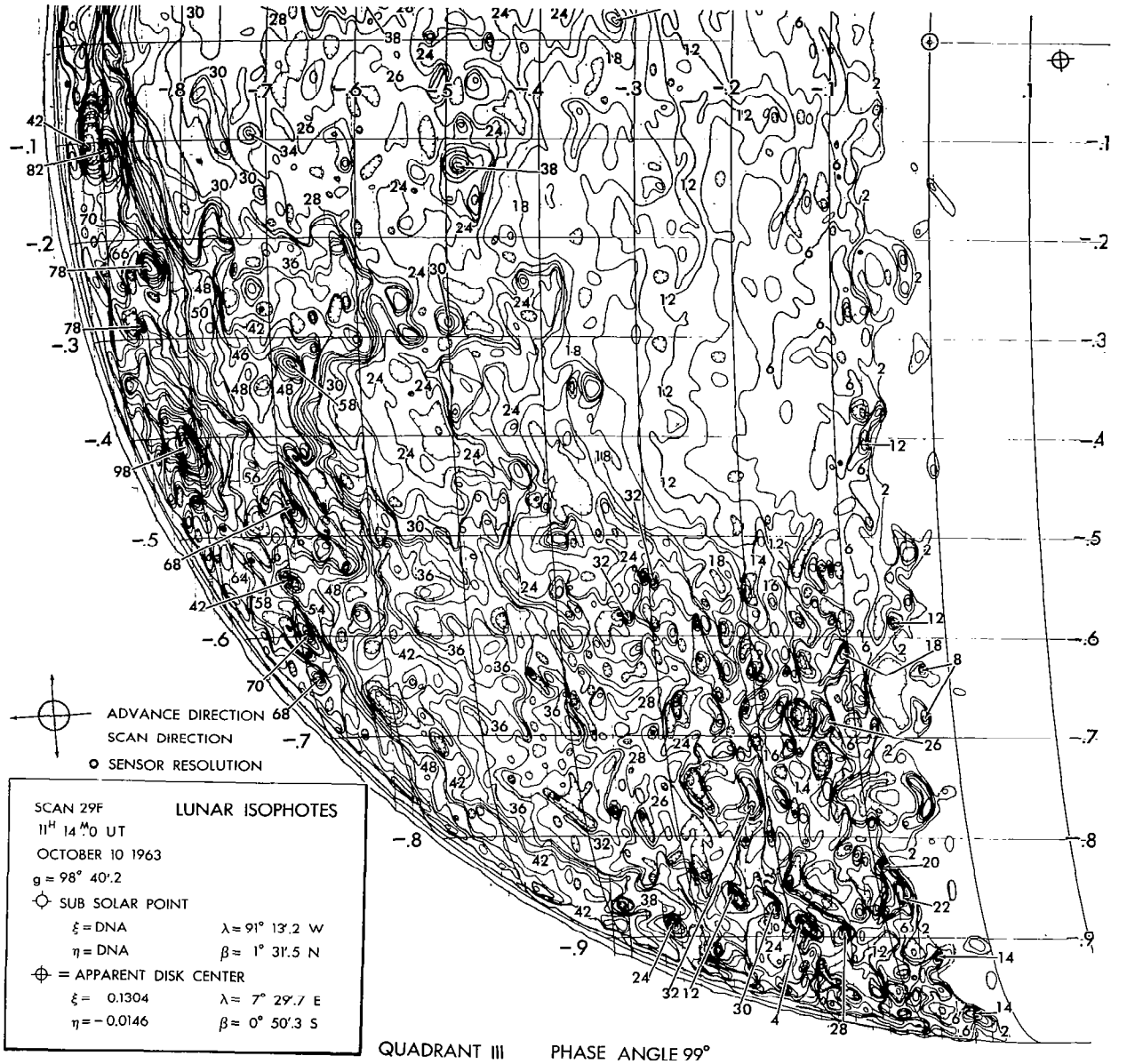
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.08	30	9.65	62	19.95	94	30.25
.75	.24	32	10.30	64	20.60	96	30.89
2	.64	34	10.94	66	21.24	98	31.54
4	1.29	36	11.58	68	21.88	100	32.18
6	1.93	38	12.23	70	22.53	102	32.82
8	2.57	40	12.87	72	23.17	104	33.47
10	3.22	42	13.52	74	23.81		
12	3.86	44	14.16	76	24.46		
14	4.51	46	14.80	78	25.10		
16	5.15	48	15.45	80	25.74		
18	5.79	50	16.09	82	26.39		
20	6.44	52	16.73	84	27.03		
22	7.08	54	17.38	86	27.67		
24	7.72	56	18.02	88	28.32		
26	8.37	58	18.66	90	28.96		
28	9.01	60	19.31	92	29.61		



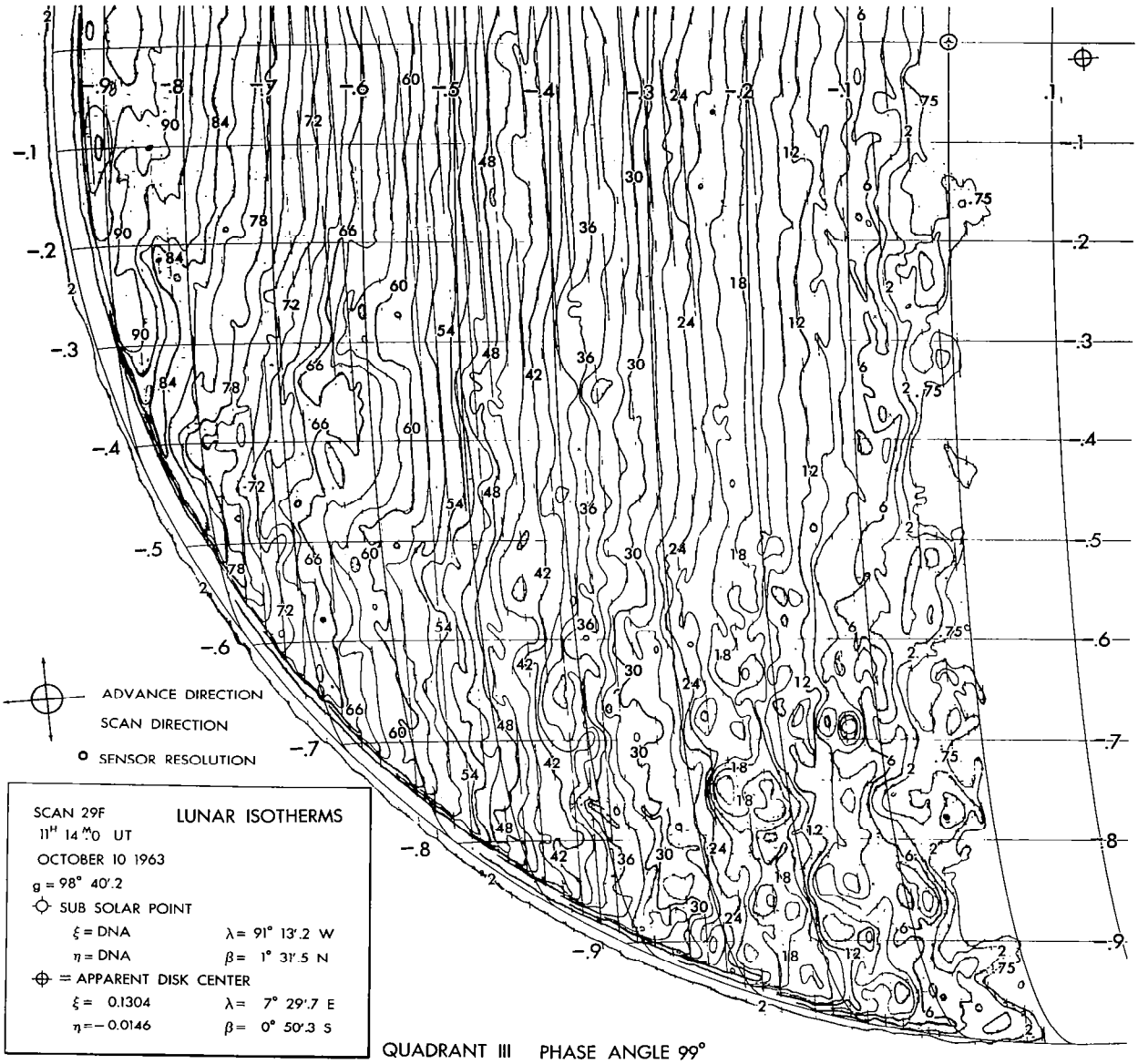
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	150.7	32	264.3	64	306.6	96	338.1
2	169.7	34	267.5	66	308.8	98	339.9
4	186.4	36	270.6	68	311.0	100	341.6
6	197.8	38	273.7	70	313.1		
8	206.8	40	276.6	72	315.2		
10	214.3	42	279.4	74	317.2		
12	220.9	44	282.2	76	319.2		
14	226.7	46	284.9	78	321.2		
16	232.0	48	287.5	80	323.2		
18	237.0	50	290.1	82	325.2		
20	241.5	52	292.6	84	327.1		
22	245.8	54	295.1	86	329.0		
24	249.9	56	297.5	88	330.8		
26	253.7	58	299.8	90	332.7		
28	257.4	60	302.1	92	334.5		
30	260.9	62	304.4	94	336.3		



BRIGHTNESS CALIBRATION DATA

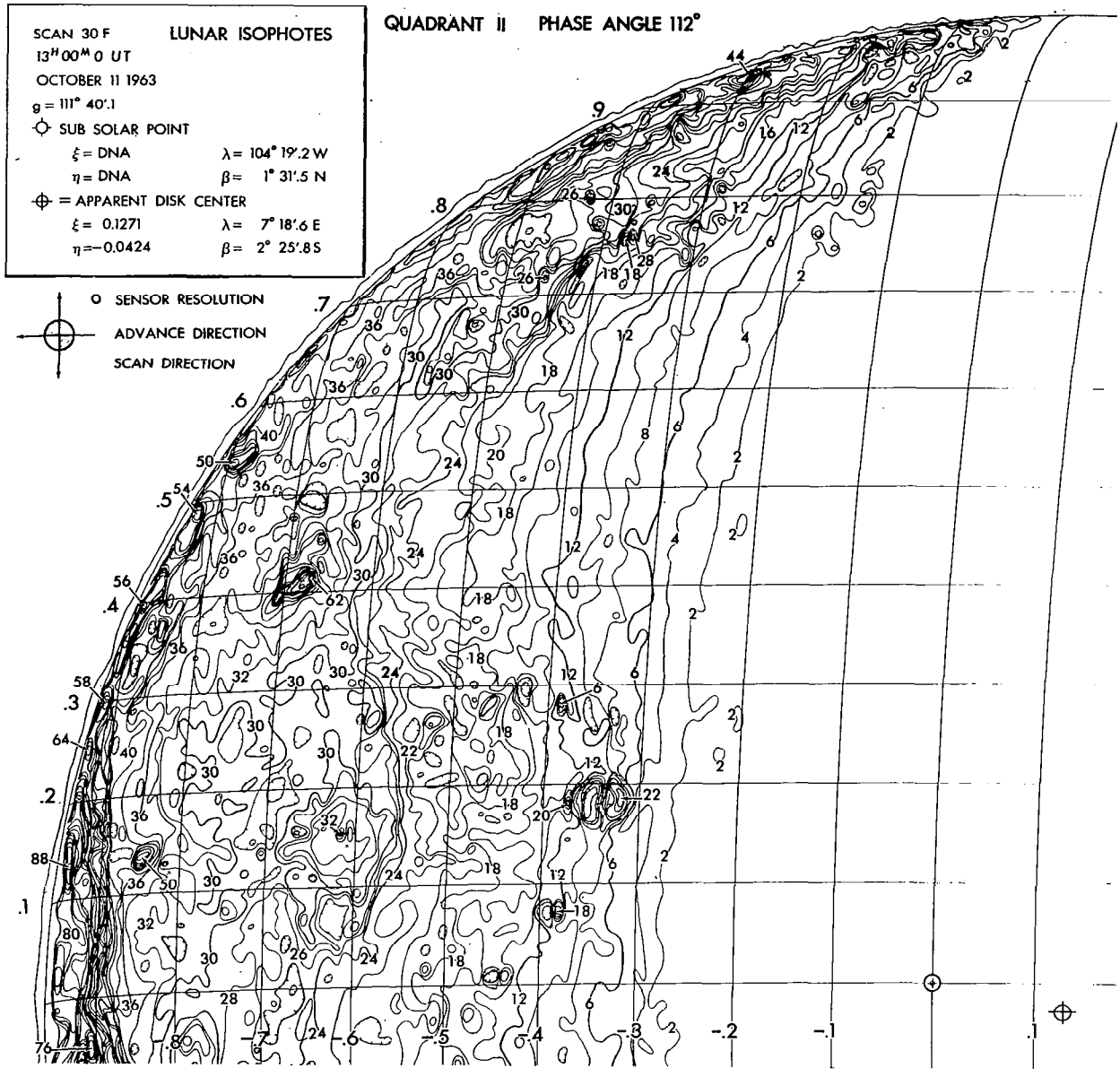
Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.08	30	9.65	62	19.95	94	30.25
.75	.24	32	10.30	64	20.60	96	30.89
2	.64	34	10.94	66	21.24	98	31.54
4	1.29	36	11.58	68	21.88	100	32.18
6	1.93	38	12.23	70	22.53	102	32.82
8	2.57	40	12.87	72	23.17	104	33.47
10	3.22	42	13.52	74	23.81		
12	3.86	44	14.16	76	24.46		
14	4.51	46	14.80	78	25.10		
16	5.15	48	15.45	80	25.74		
18	5.79	50	16.09	82	26.39		
20	6.44	52	16.73	84	27.03		
22	7.08	54	17.38	86	27.67		
24	7.72	56	18.02	88	28.32		
26	8.37	58	18.66	90	28.96		
28	9.01	60	19.31	92	29.61		



QUADRANT III PHASE ANGLE 99°

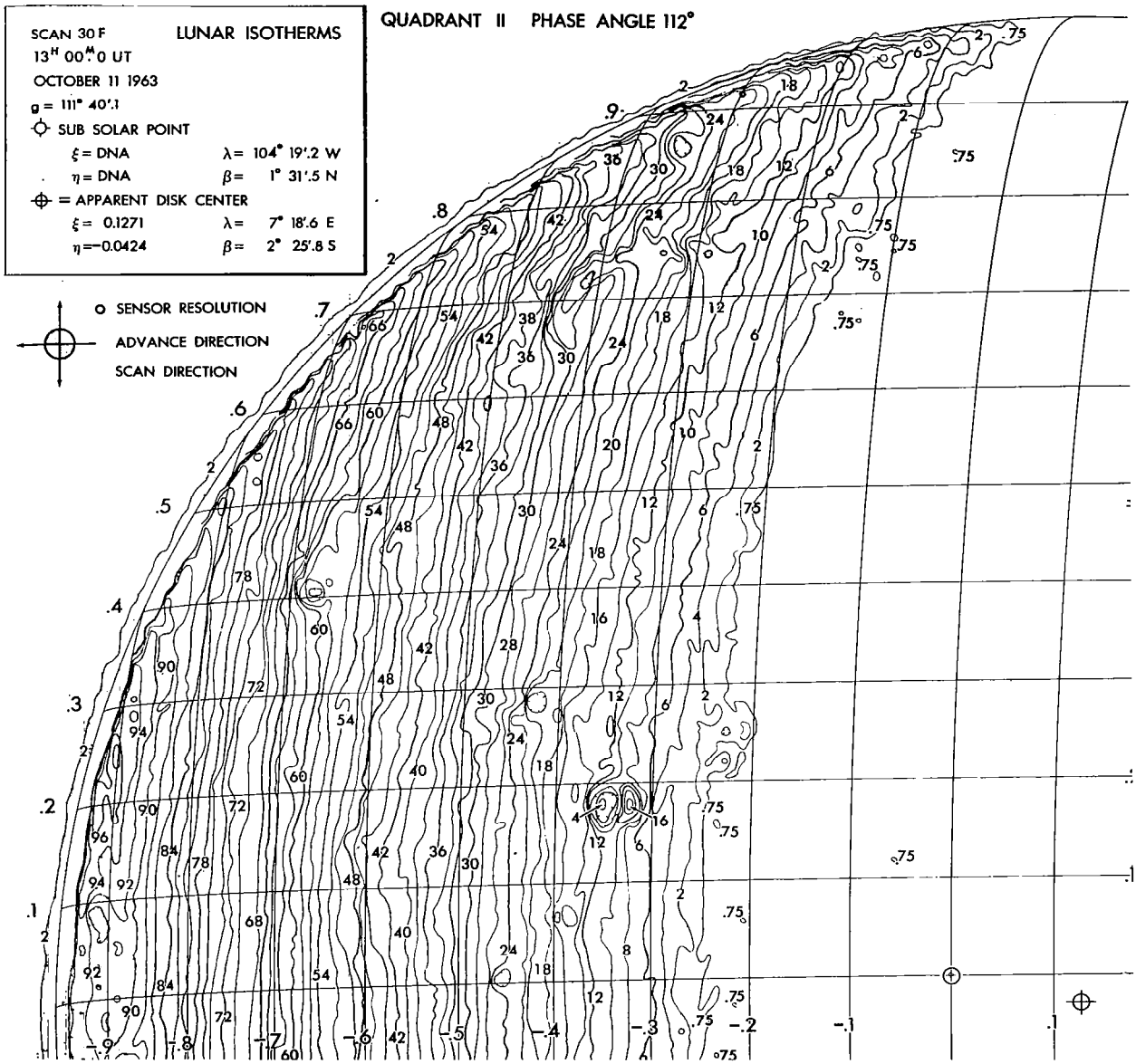
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	150.7	32	264.3	64	306.6	96	338.1
2	169.7	34	267.5	66	308.8	98	339.9
4	186.4	36	270.6	68	311.0	100	341.6
6	197.8	38	273.7	70	313.1		
8	206.8	40	276.6	72	315.2		
10	214.3	42	279.4	74	317.2		
12	220.9	44	282.2	76	319.2		
14	226.7	46	284.9	78	321.2		
16	232.0	48	287.5	80	323.2		
18	237.0	50	290.1	82	325.2		
20	241.5	52	292.6	84	327.1		
22	245.8	54	295.1	86	329.0		
24	249.9	56	297.5	88	330.8		
26	253.7	58	299.8	90	332.7		
28	257.4	60	302.1	92	334.5		
30	260.9	62	304.4	94	336.3		



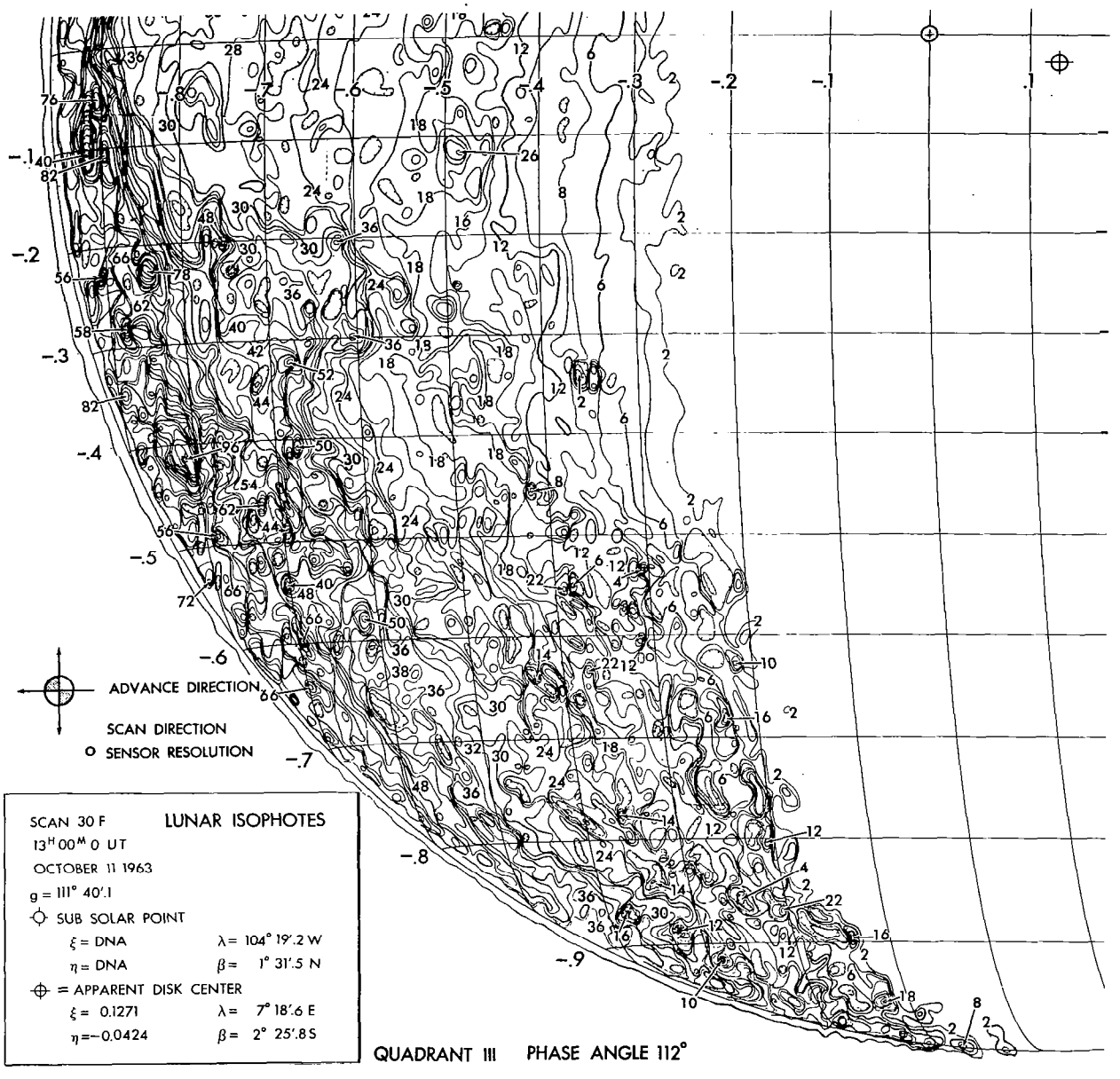
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.07	30	8.09	62	16.70
.75	.20	32	8.62	64	17.23
2	.54	34	9.16	66	17.77
4	1.08	36	9.69	68	18.31
6	1.62	38	10.23	70	18.85
8	2.15	40	10.77	72	19.39
10	2.69	42	11.31	74	19.93
12	3.23	44	11.85	76	20.47
14	3.77	46	12.39	78	21.05
16	4.31	48	12.93	80	21.54
18	4.85	50	13.46	82	22.08
20	5.39	52	14.00	84	22.62
22	5.92	54	14.54	86	23.16
24	6.46	56	15.08		
26	7.00	58	15.62		
28	7.54	60	16.16		



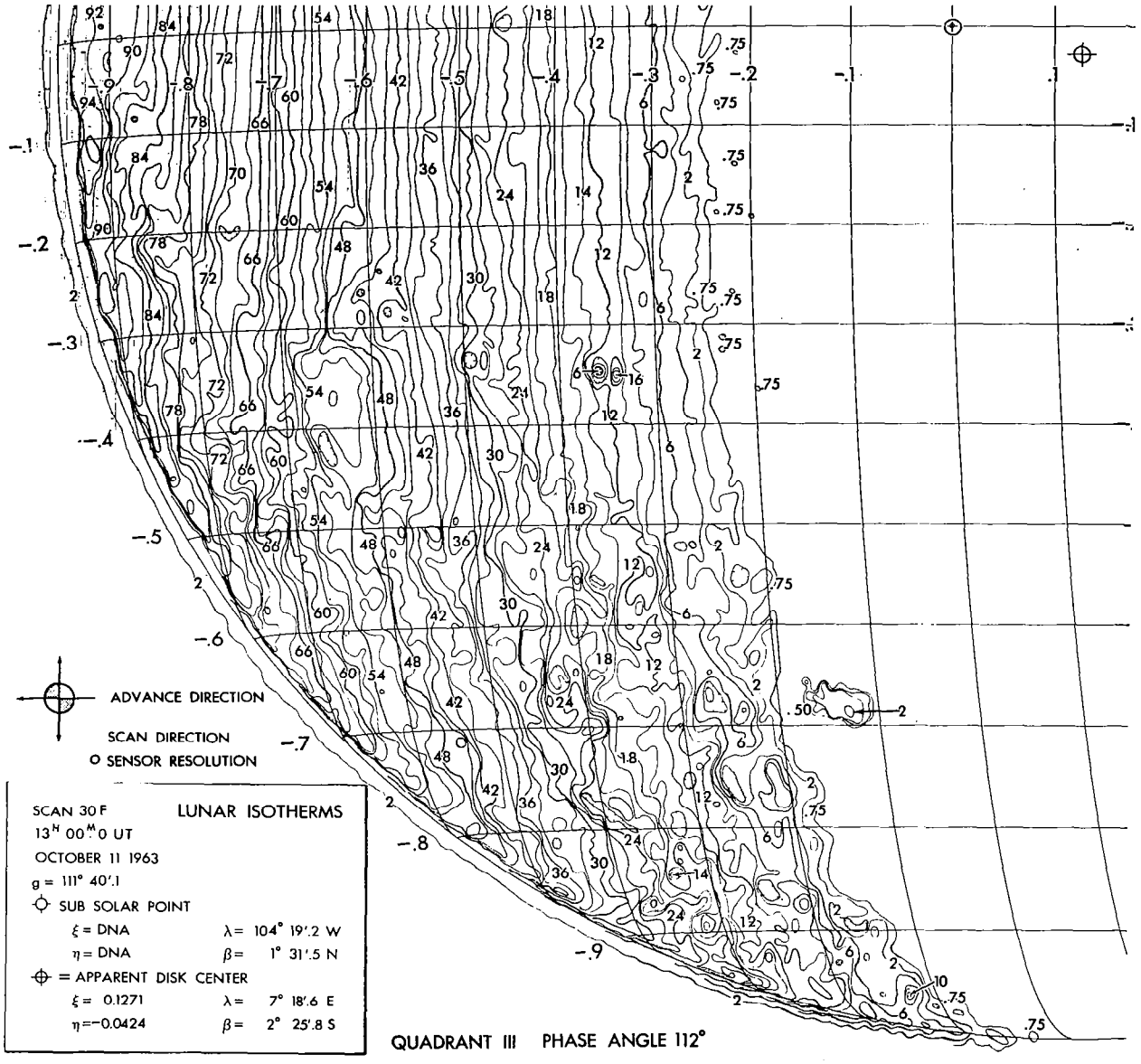
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.50	143.9	30	260.7	62	304.2	94	336.0
.75	150.7	32	264.1	64	306.4	96	337.8
2	169.7	34	267.3	66	308.6	98	339.6
4	186.4	36	270.5	68	310.7	100	341.3
6	197.7	38	273.5	70	312.8		
8	206.7	40	276.4	72	314.9		
10	214.2	42	279.2	74	317.0		
12	220.7	44	282.0	76	319.0		
14	226.6	46	284.7	78	321.0		
16	231.9	48	287.3	80	322.9		
18	236.8	50	289.9	82	324.9		
20	241.4	52	292.4	84	326.8		
22	245.7	54	294.8	86	328.7		
24	249.7	56	297.2	88	330.5		
26	253.6	58	299.6	90	332.4		
28	257.2	60	301.9	92	334.2		



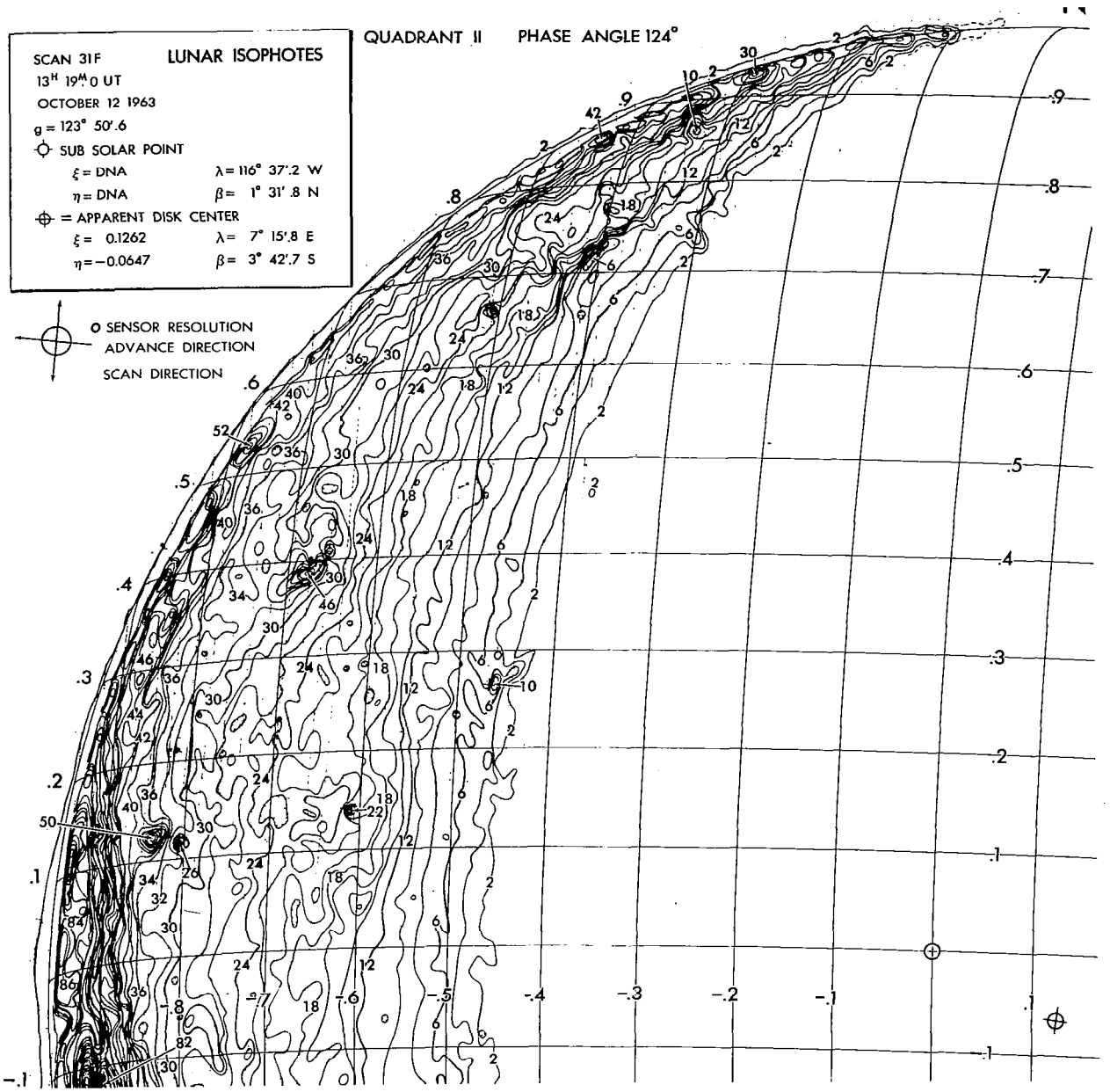
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.07	30	8.09	62	16.70
.75	.20	32	8.62	64	17.23
2	.54	34	9.16	66	17.77
4	1.08	36	9.69	68	18.31
6	1.62	38	10.23	70	18.85
8	2.15	40	10.77	72	19.39
10	2.69	42	11.31	74	19.93
12	3.23	44	11.85	76	20.47
14	3.77	46	12.39	78	21.05
16	4.31	48	12.93	80	21.54
18	4.85	50	13.46	82	22.08
20	5.39	52	14.00	84	22.62
22	5.92	54	14.54	86	23.16
24	6.46	56	15.08		
26	7.00	58	15.62		
28	7.54	60	16.16		



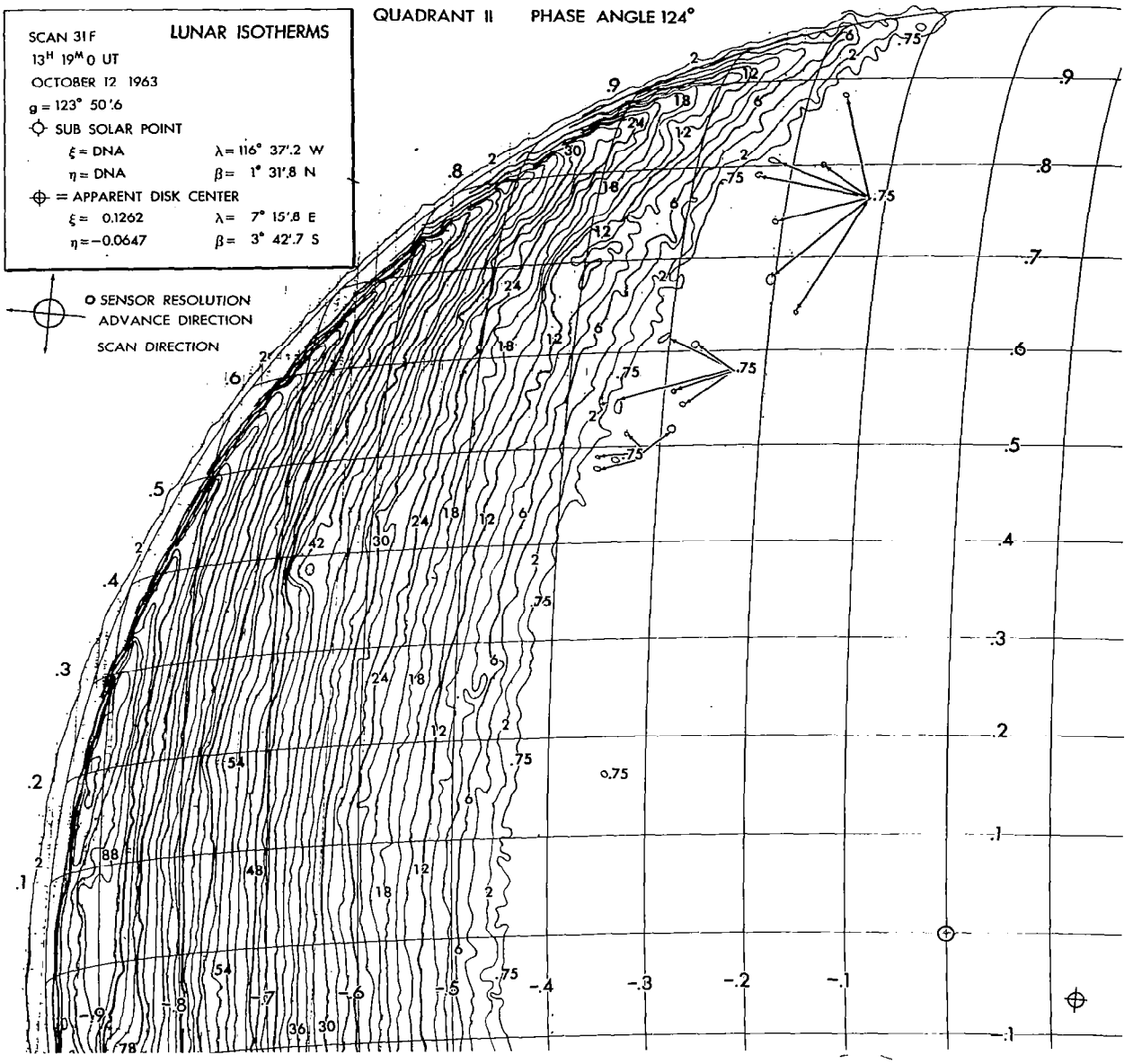
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.50	143.9	30	260.7	62	304.2	94	336.0
.75	150.7	32	264.1	64	306.4	96	337.8
2	169.7	34	267.3	66	308.6	98	339.6
4	186.4	36	270.5	68	310.7	100	341.3
6	197.7	38	273.5	70	312.8		
8	206.7	40	276.4	72	314.9		
10	214.2	42	279.2	74	317.0		
12	220.7	44	282.0	76	319.0		
14	226.6	46	284.7	78	321.0		
16	231.9	48	287.3	80	322.9		
18	236.8	50	289.9	82	324.9		
20	241.4	52	292.4	84	326.8		
22	245.7	54	294.8	86	328.7		
24	249.7	56	297.2	88	330.5		
26	253.6	58	299.6	90	332.4		
28	257.2	60	301.9	92	334.2		



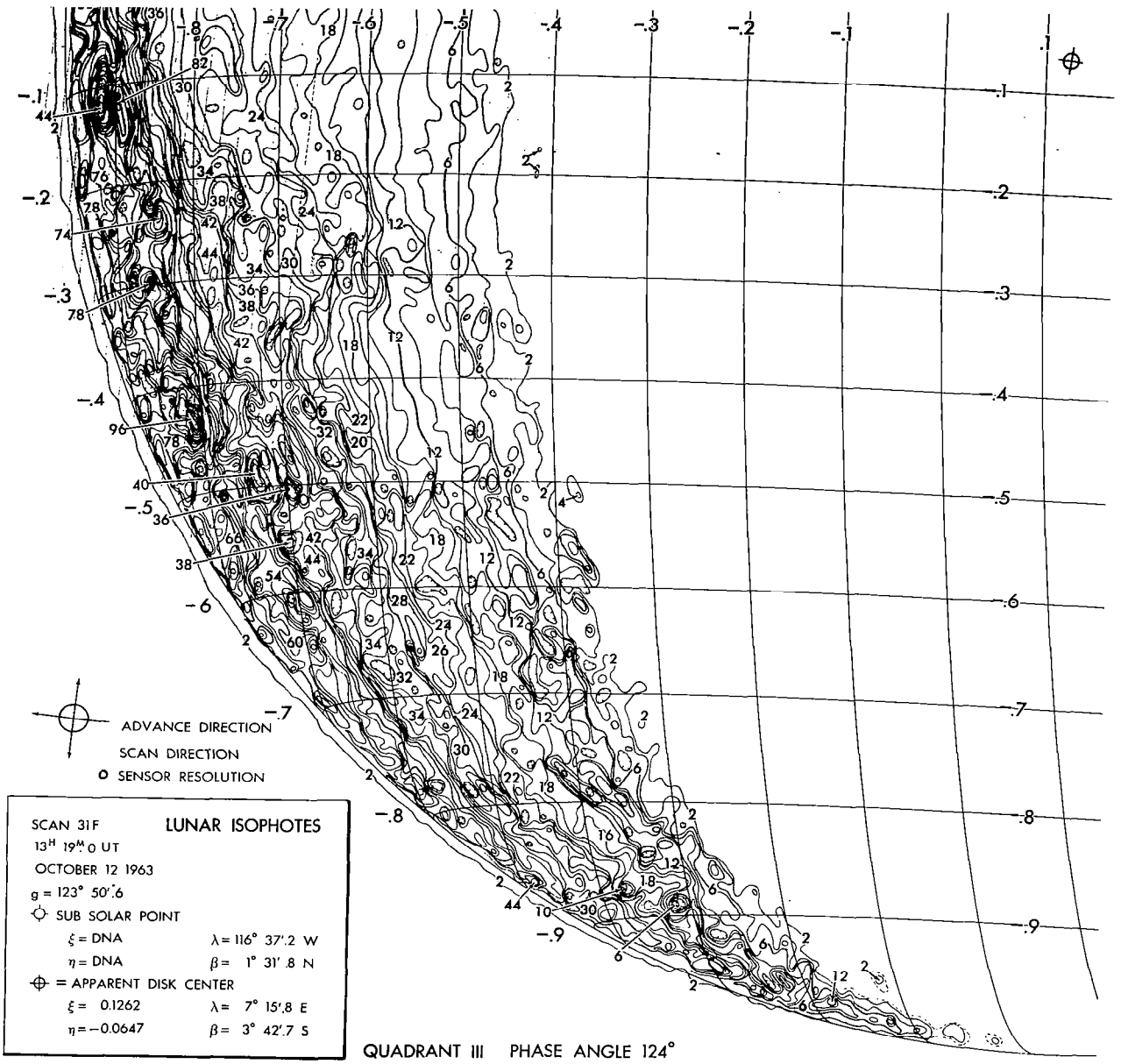
BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.05	30	6.41	62	13.25	94	20.09
.75	.16	32	6.84	64	13.68	96	20.52
2	.43	34	7.27	66	14.11	98	20.95
4	.86	36	7.70	68	14.54	100	21.38
6	1.28	38	8.12	70	14.96	102	21.80
8	1.71	40	8.55	72	15.39	104	22.23
10	2.14	42	8.98	74	15.82		
12	2.57	44	9.41	76	16.25		
14	2.99	46	9.83	78	16.67		
16	3.42	48	10.26	80	17.10		
18	3.85	50	10.69	82	17.53		
20	4.28	52	11.12	84	17.96		
22	4.70	54	11.54	86	18.38		
24	5.13	56	11.97	88	18.81		
26	5.56	58	12.40	90	19.24		
28	5.99	60	12.83	92	19.67		



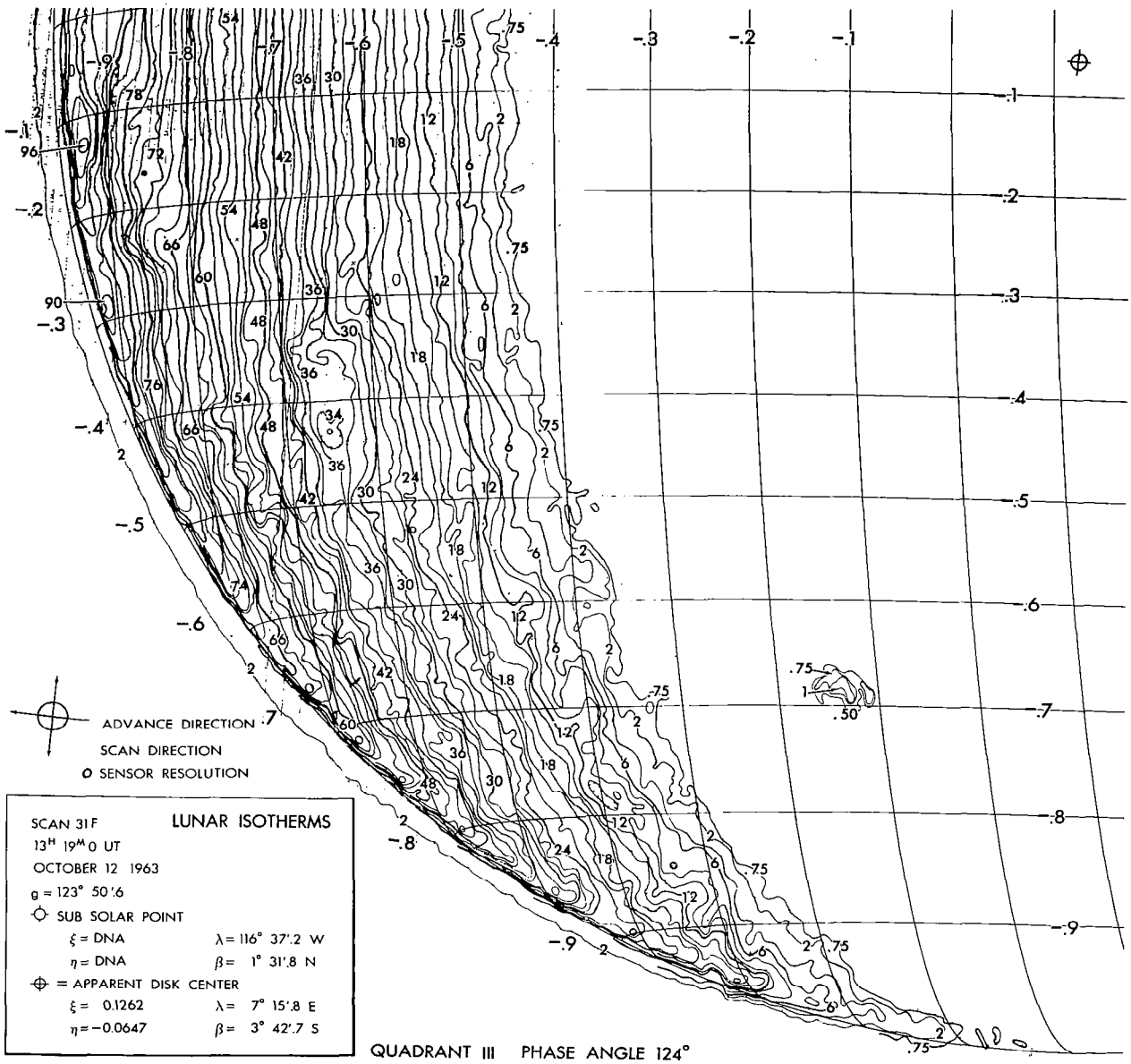
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	144.5	32	245.5	64	281.8	96	308.3
2	161.8	34	248.3	66	283.6	98	309.8
4	176.9	36	251.0	68	285.5	100	311.2
6	187.1	38	253.6	70	287.3		
8	195.1	40	256.1	72	289.0		
10	201.8	42	258.6	74	290.8		
12	207.6	44	261.0	76	292.5		
14	212.7	46	263.3	78	294.1		
16	217.4	48	265.5	80	295.8		
18	221.7	50	267.7	82	297.4		
20	225.8	52	269.9	84	299.1		
22	229.5	54	272.0	86	300.6		
24	233.0	56	274.0	88	302.2		
26	236.4	58	276.0	90	303.8		
28	239.6	60	278.0	92	305.3		
30	242.6	62	279.9	94	306.8		



BRIGHTNESS CALIBRATION DATA

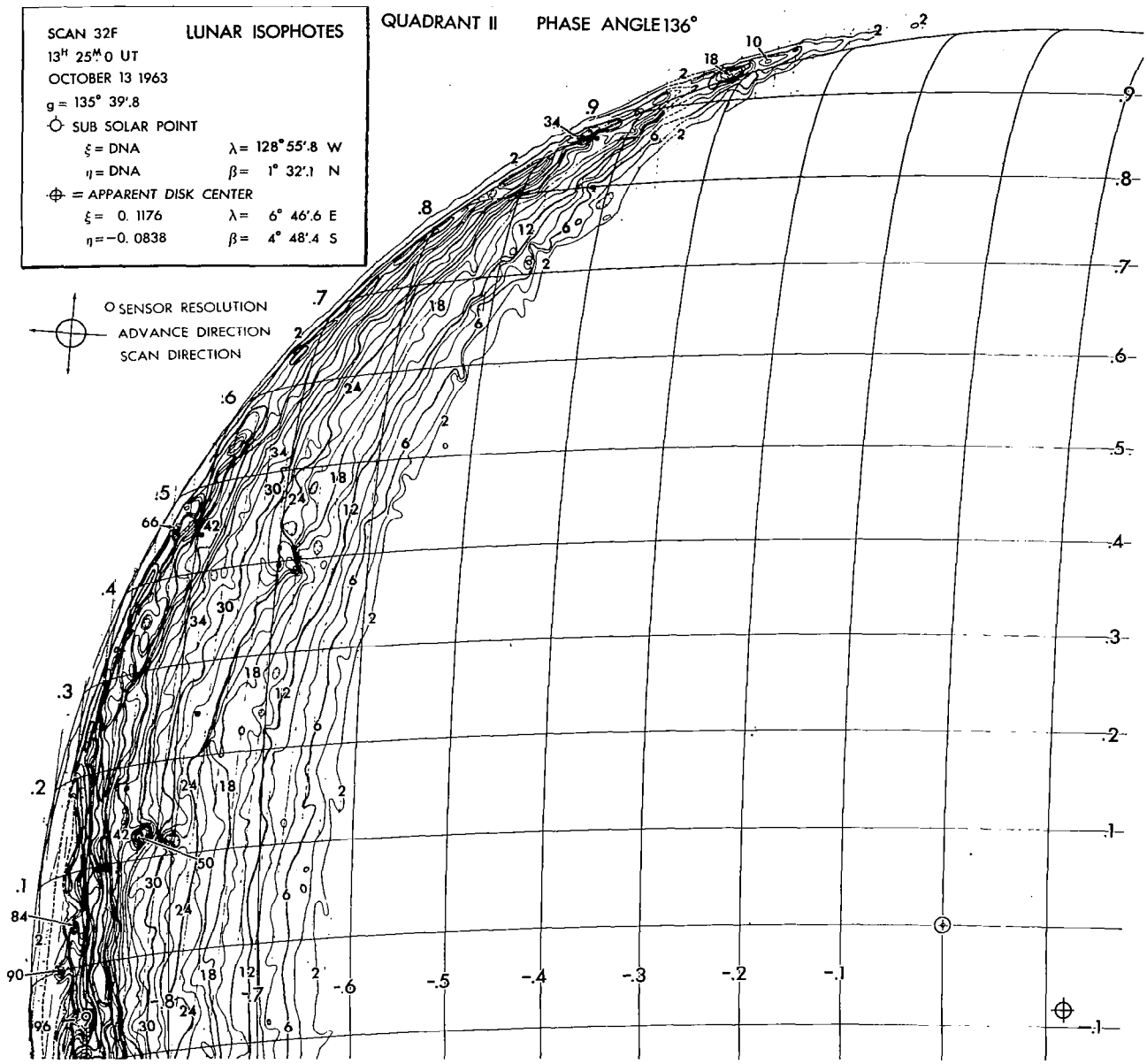
Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.05	30	6.41	62	13.25	94	20.09
.75	.16	32	6.84	64	13.68	96	20.52
2	.43	34	7.27	66	14.11	98	20.95
4	.86	36	7.70	68	14.54	100	21.38
6	1.28	38	8.12	70	14.96	102	21.80
8	1.71	40	8.55	72	15.39	104	22.23
10	2.14	42	8.98	74	15.82		
12	2.57	44	9.41	76	16.25		
14	2.99	46	9.83	78	16.67		
16	3.42	48	10.26	80	17.10		
18	3.85	50	10.69	82	17.53		
20	4.28	52	11.12	84	17.96		
22	4.70	54	11.54	86	18.38		
24	5.13	56	11.97	88	18.81		
26	5.56	58	12.40	90	19.24		
28	5.99	60	12.83	92	19.67		



QUADRANT III PHASE ANGLE 124°

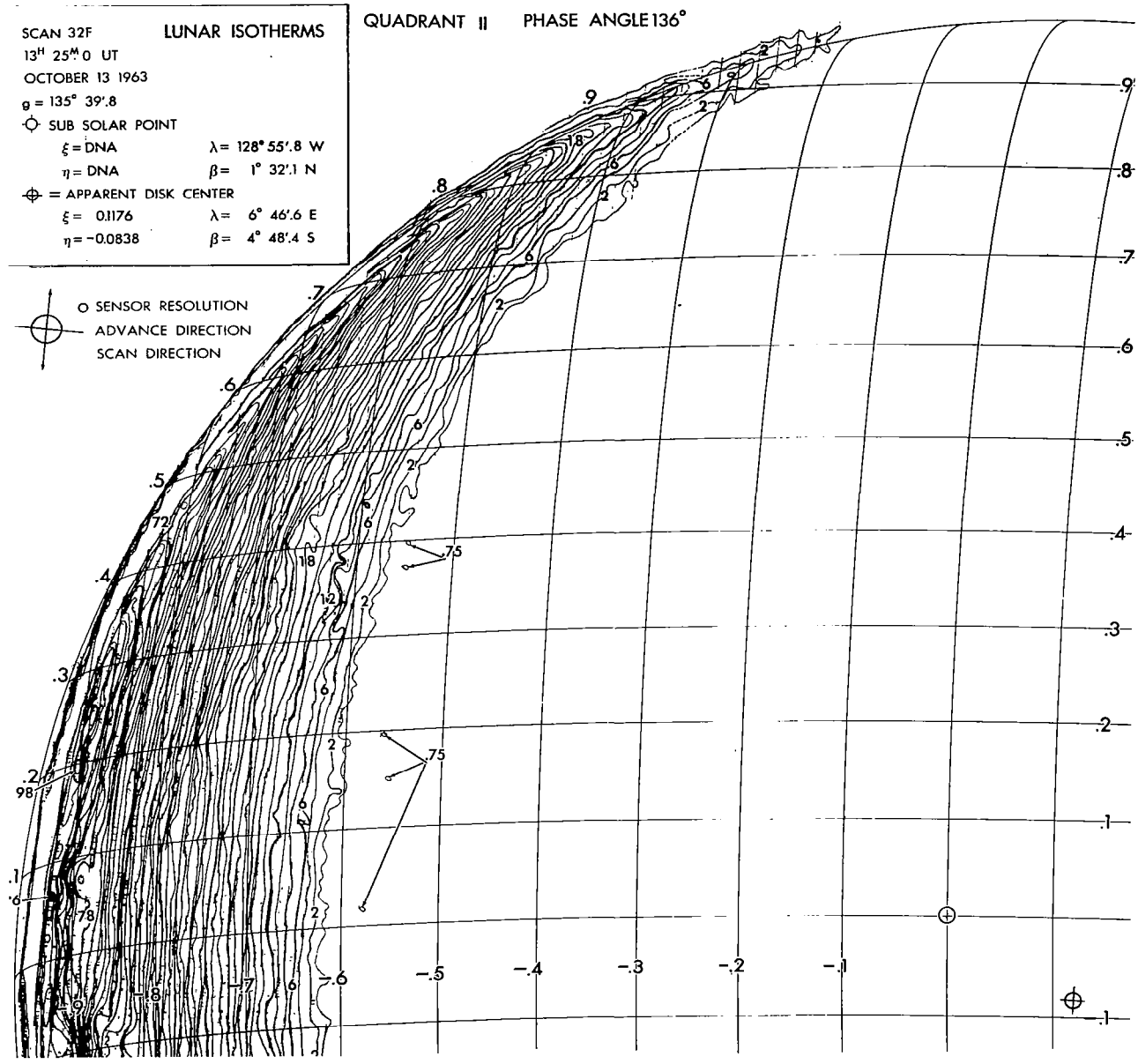
THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	144.5	32	245.5	64	281.8	96	308.3
2	161.8	34	248.3	66	283.6	98	309.8
4	176.9	36	251.0	68	285.5	100	311.2
6	187.1	38	253.6	70	287.3		
8	195.1	40	256.1	72	289.0		
10	201.8	42	258.6	74	290.8		
12	207.6	44	261.0	76	292.5		
14	212.7	46	263.3	78	294.1		
16	217.4	48	265.5	80	295.8		
18	221.7	50	267.7	82	297.4		
20	225.8	52	269.9	84	299.1		
22	229.5	54	272.0	86	300.6		
24	233.0	56	274.0	88	302.2		
26	236.4	58	276.0	90	303.8		
28	239.6	60	278.0	92	305.3		
30	242.6	62	279.9	94	306.8		



BRIGHTNESS CALIBRATION DATA

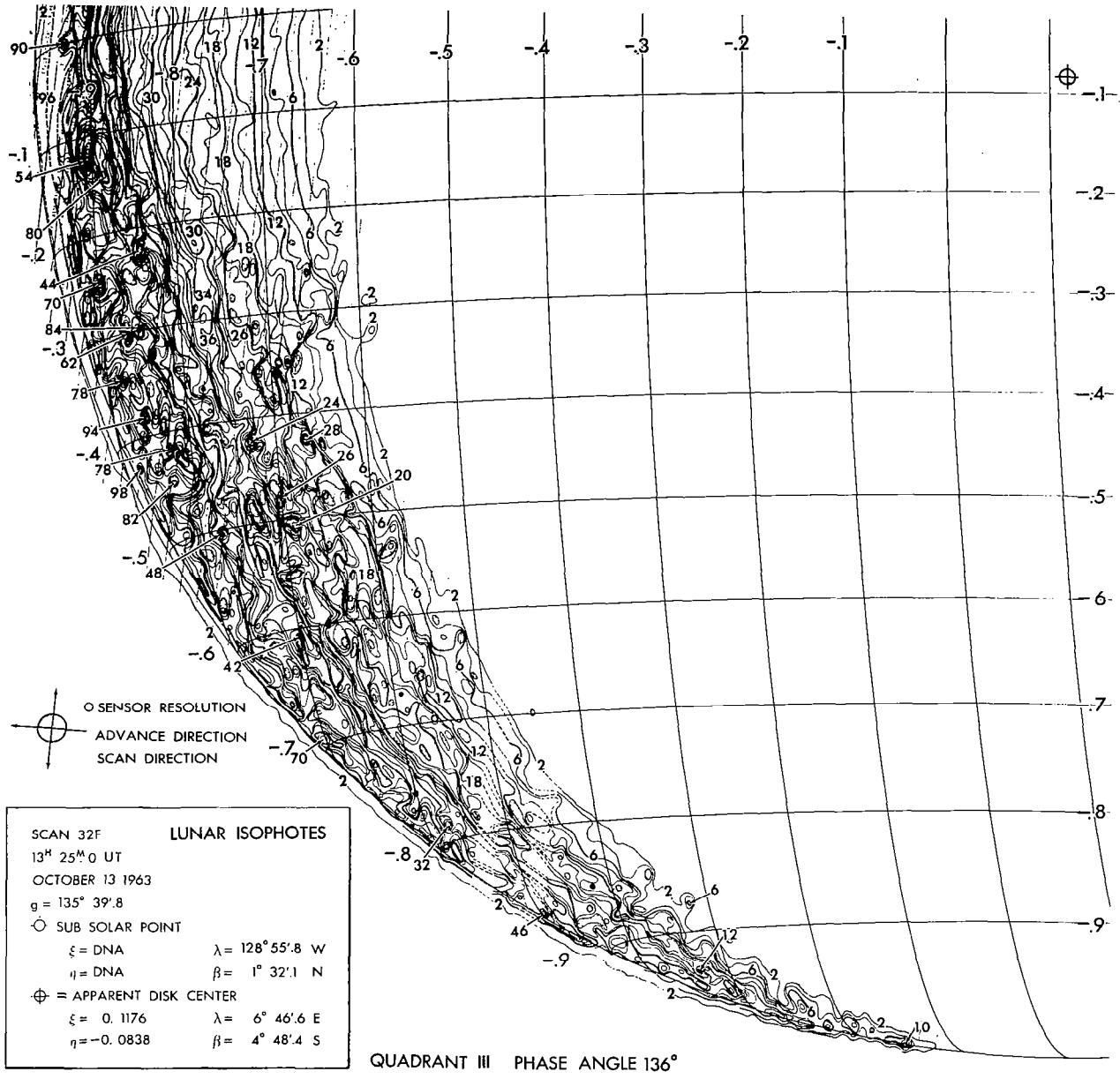
Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.04	30	4.72	62	9.75	94	14.78
.75	.12	32	5.03	64	10.06	96	15.09
2	.31	34	5.35	66	10.38	98	15.41
4	.63	36	5.67	68	10.69	100	15.72
6	.94	38	5.97	70	11.01	102	16.04
8	1.26	40	6.29	72	11.32	104	16.35
10	1.57	42	6.60	74	11.64	106	16.67
12	1.89	44	6.92	76	11.95	108	16.98
14	2.20	46	7.23	78	12.26	110	17.30
16	2.51	48	7.55	80	12.58		
18	2.83	50	7.86	82	12.89		
20	3.14	52	8.18	84	12.20		
22	3.46	54	8.49	86	13.52		
24	3.77	56	8.80	88	13.84		
26	4.09	58	9.12	90	14.15		
28	4.40	60	9.43	92	14.47		



THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	137.5	30	223.7	62	255.2	94	277.5
1	141.6	32	226.2	64	256.7	96	278.7
2	153.1	34	228.6	66	258.3	98	279.9
4	166.6	36	230.9	68	259.8	100	281.1
*6.80	178.8	38	233.1	70	261.3		
8	182.6	40	235.2	72	262.8		
10	188.5	42	237.3	74	264.2		
12	193.5	44	239.3	76	265.6		
14	198.0	46	241.2	78	267.0		
16	202.1	48	243.1	80	268.4		
18	205.8	50	245.0	82	269.7		
20	209.3	52	246.8	84	271.1		
22	212.5	54	248.5	86	272.4		
24	215.5	56	250.2	88	273.7		
26	218.4	58	251.9	90	275.0		
28	221.1	60	253.6	92	276.2		

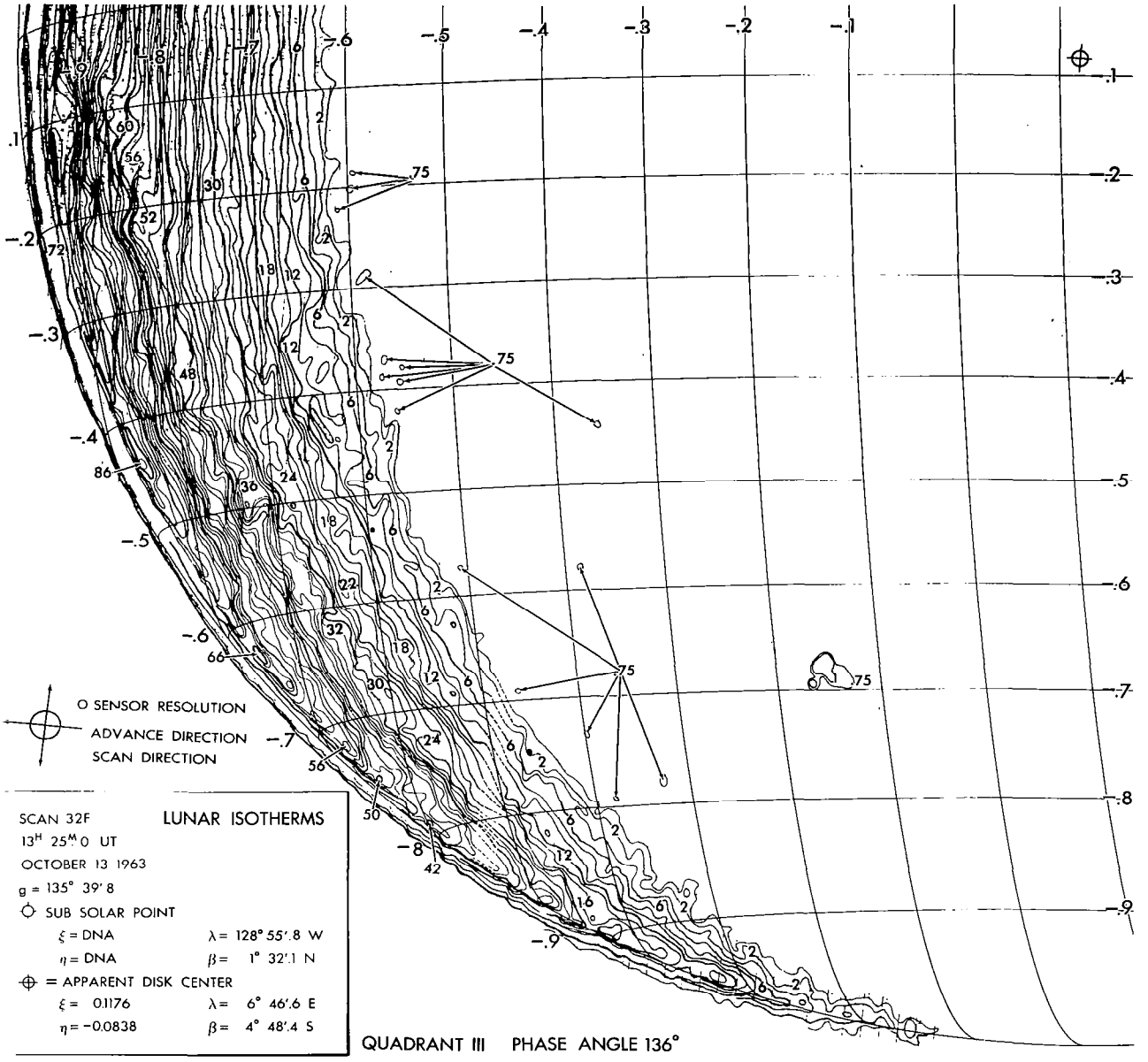
*Note that the Number 6 level was not contoured.



QUADRANT III PHASE ANGLE 136°

BRIGHTNESS CALIBRATION DATA

Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b	Contour Number	Brightness Value b
.25	.04	30	4.72	62	9.75	94	14.78
.75	.12	32	5.03	64	10.06	96	15.09
2	.31	34	5.35	66	10.38	98	15.41
4	.63	36	5.67	68	10.69	100	15.72
6	.94	38	5.97	70	11.01	102	16.04
8	1.26	40	6.29	72	11.32	104	16.35
10	1.57	42	6.60	74	11.64	106	16.67
12	1.89	44	6.92	76	11.95	108	16.98
14	2.20	46	7.23	78	12.26	110	17.30
16	2.51	48	7.55	80	12.58		
18	2.83	50	7.86	82	12.89		
20	3.14	52	8.18	84	12.20		
22	3.46	54	8.49	86	13.52		
24	3.77	56	8.80	88	13.84		
26	4.09	58	9.12	90	14.15		
28	4.40	60	9.43	92	14.47		



THERMAL CALIBRATION DATA

Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K	Contour Number	Temperature °K
.75	137.5	30	223.7	62	255.2	94	277.5
1	141.6	32	226.2	64	256.7	96	278.7
2	153.1	34	228.6	66	258.3	98	279.9
4	166.6	36	230.9	68	259.8	100	281.1
*6.80	178.8	38	233.1	70	261.3		
8	182.6	40	235.2	72	262.8		
10	188.5	42	237.3	74	264.2		
12	193.5	44	239.3	76	265.6		
14	198.0	46	241.2	78	267.0		
16	202.1	48	243.1	80	268.4		
18	205.8	50	245.0	82	269.7		
20	209.3	52	246.8	84	271.1		
22	212.5	54	248.5	86	272.4		
24	215.5	56	250.2	88	273.7		
26	218.4	58	251.9	90	275.0		
28	221.1	60	253.6	92	276.2		

*Note that the Number 6 level was not contoured.

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NASA-Langley, 1967 —— 30 CR-855

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